RICOH VT-3800

MODEL

SERVICE MANUAL

IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.

HEALTH SAFETY CONDITIONS

1. If you get ink in your eyes by accident, try to remove it with eye drops or flush with water as first aid. If unsuccessful, get medical attention.
2. If you ingest ink by accident, induce vomiting by sticking a finger down your throat or by giving soapy or strong salty water to drink.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The printer and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.

⚠CAUTION

The RAM board has a lithium battery which can explode if handled incorrectly. Replace only with the same type of RAM board. Do not recharge or burn this battery. Used RAM boards must be handled in accordance with local regulations.

⚠ATTENTION

La carte RAM comporte une pile au lithium qui présente un risque d'explosion en cas de mauvaise manipulation. Remplacer la pile uniquement par une carte RAM identique. Ne pas recharger ni brûler cette pile. Les cartes RAM usagées doivent être éliminées conformément aux réglementations locales.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Dispose of replaced parts in accordance with local regulations.
2. Used ink and masters should be disposed of in an envionmentally safe manner and in accordance with local regulations.
3. When keeping used lithium batteries (from the main control boards) in order to dispose of them later, do not store more than 100 batteries (from the main control boards) per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

SECTION 1

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration:	Table-top
Master Processing:	Digital
Printing Process:	Fully automatic one-drum stencil system
Original Type:	Sheet/Book
Original Size:	Maximum 307 mm x 432 mm (12.0" x 17.0")
Reduction Ratios:	Inch version: 93%, 77%, 74%, 65% Metric version: 93%, 87%, 82%, 71%
Enlargement Ratios:	Inch version: 155%, 129%, 121% Metric Version: 141%, 122%, 115%
Zoom:	From 50% to 200% in 1% steps
Directional Magnification:	Vertical: From 50% to 200% in 1% steps Horizontal: From 50% to 200% in 1% steps
Image Mode:	Line, Photo, Line/Photo
Color Printing:	Drum unit replacement system (Red, Blue, Green, Brown, Yellow, Purple, Navy, and Maroon)
Master Feed/Eject:	Roll master, automatic feed/eject
Leading Edge Margin:	5 mm (0.2")
Trailing Edge Margin:	3 mm (0.12")
Printer Paper Size:	Maximum 297 mm x 432 mm (11.6" x 17.0") Minimum 90 mm x 148 mm (3.6" x 5.8")
Printing Area:	A3 drum When using A3 paper: More than 290 mm x 410 mm, 11.4" x 16.1" When using 8 1/2" x 11" paper: More than 290 mm x 415 mm, 11.4" x 16.3" A4 drum More than 290 mm x 204 mm, 11.4" x 8.0"
Print Paper Weight:	47.1 g/m^2 to 209.3 g/m^2 (12.5 lb to 55.6 lb)
Printing Speed:	60, 75, 90, 105, 120 sheets/minute (5 steps)

First Copy Time (Master Process Time):	Less than 23.5 seconds (A3, 11" x 17") Less than 19.0 seconds (A4, 8 1/2" x 11")
Second Copy time (First Print Time):	Less than 26.5 seconds (A3, 11" x 17") Less than 21.5 seconds (A4, 8 1/2" x 11")
Paper Feed Table Capacity:	1,000 sheets (80g/m^2, 20 lb)
Paper Delivery Table Capacity:	1,000 sheets (66.3 g/m^2, 17.6 lb) 1,000 sheets (80g/m^2, 20 lb)
Power Source:	120 V, 50/60 Hz, 3.6 A (for N. America) 220/240 V, 50/60 Hz, 2.0 A (for Europe, Asia)
Power Consumption:	120 V, 50/60 Hz, 400 W (for N. America) 220/240 V, 50/60 Hz, 400 W (for Europe, Asia)
Weight:	120 V version: 125 kg (275.5 lb) 220/240 V version: 125 kg (275.5 lb) Cabinet: 23.5 kg (51.8 lb)

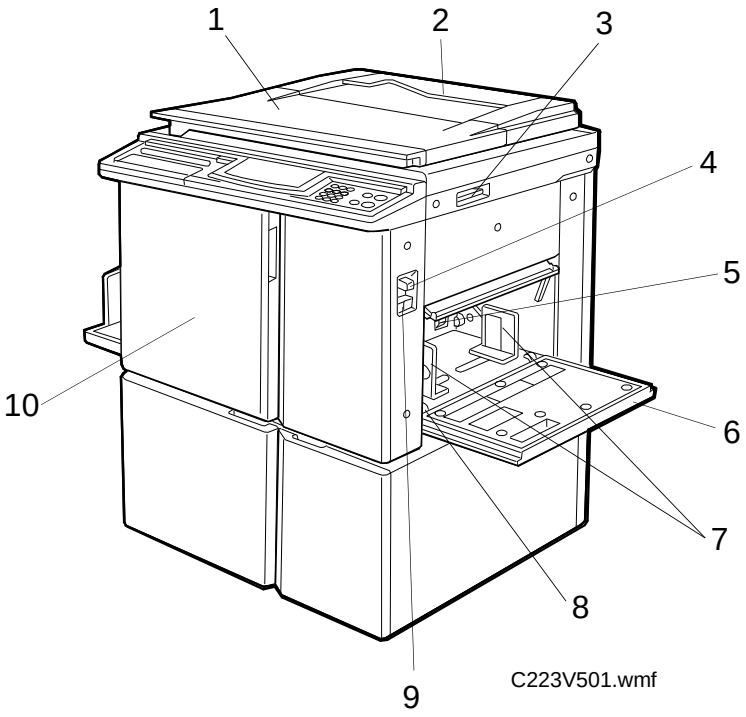
Dimensions (W x D x H):

	Width	Depth	Height
Stored	719 mm, 28.4"	698 mm, 27.5"	646 mm, 25.5"
Stored with document feeder	719 mm, 28.4"	698 mm, 27.5"	676 mm, 26.7"
Set up	719 mm, 28.4"	698 mm, 27.5"	644 mm, 25.4"
Set up with cabinet	719 mm, 28.4"	698 mm, 27.5"	1,072 mm, 42.3"
Set up with document feeder	1,331 mm, 52.5"	698 mm, 27.5"	666 mm, 26.3"
Set up with cabinet and document feeder	1,331 mm, 52.5"	698 mm, 27.5"	1,092 mm, 43.0"

Original Scanning Time:	2.5 ms/line
Pixel Density:	400 dpi
Master Eject Box Capacity:	More than 50 masters under low temperature More than 60 masters at 23 °C, 73°F More than 60 masters under high temperature
Paper Separation:	Friction roller/center separation system
Feed Table Side Plate Movement:	88 mm to 336 mm (3.46" to 13.2")
Side Registration:	±10 mm
Vertical Registration:	More than +15 mm, –20 mm, +0.59", –0.79"
Ink Supply:	Automatic ink supply system
Paper Delivery:	Air knife/vacuum delivery

Print Counter:	7 digits	
Master Counter:	6 digits	
Supplies:	Master	Thermal master 320 mm width 370 masters/roll (with A4 drum) 226 masters/roll (with A3 drum) (VT-II L master)
		Max. run length 2000 prints
	Ink	1000 cc ink pack (black) 600 cc ink pack (Red, Blue, Green, Brown, Yellow, Purple, Navy, Maroon)

2. GUIDE TO COMPONENTS



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1. Platen Cover
Lower this cover over an original before printing.

2. Original Holder
A convenient place for holding originals while operating the machine.

3. Original Table Release Lever
Use to open the original table unit when installing the master.

4. Feed Roller Pressure Lever
Use to adjust the contact pressure of the paper feed roller according to paper thickness.

5. Separation Roller Pressure Levers
Use to adjust the separation roller pressure to prevent double feed.

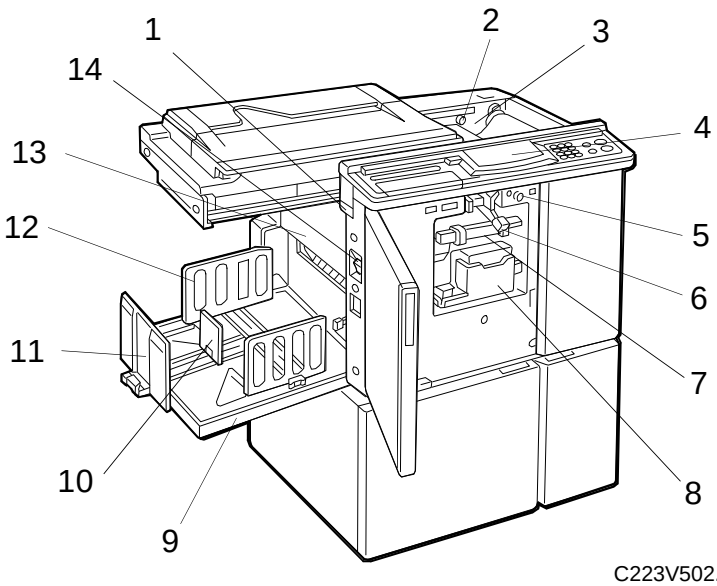
6. Paper Feed Table
Set blank paper on this table for printing.

7. Paper Feed Side Plates
Use to prevent paper skew.

8. Side Plate Fine Adjustment Dial
Use to shift the paper feed table sideways

9. Paper Feed Table Down Key
Press to lower the paper feed table.

10. Front Door
Open for access to the inside of the machine.



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1. Master Eject Unit Open Button
Press to remove misfed paper or a misfed master.

2. Master Cut Button
Press this button to cut the master paper leading edge after installing a new master roll.

3. Pressure Release Lever
Use to install the master roll.

4. Operation Panel
Operator controls and indicators are located here.

5. Drum Rotation Button
Press to replace the drum.

6. Drum Unit Lock Lever
Lift to unlock and pull out the drum unit.

7. Drum Unit
The master is wrapped around this unit.

8. Ink Holder
Set the ink cartridge in this holder.

9. Paper Delivery Table
Completed prints are delivered here.

10. Small Size Paper Delivery End Plate
Use to align the leading edges of prints that are A4, 8 1/2" x 11" or smaller.

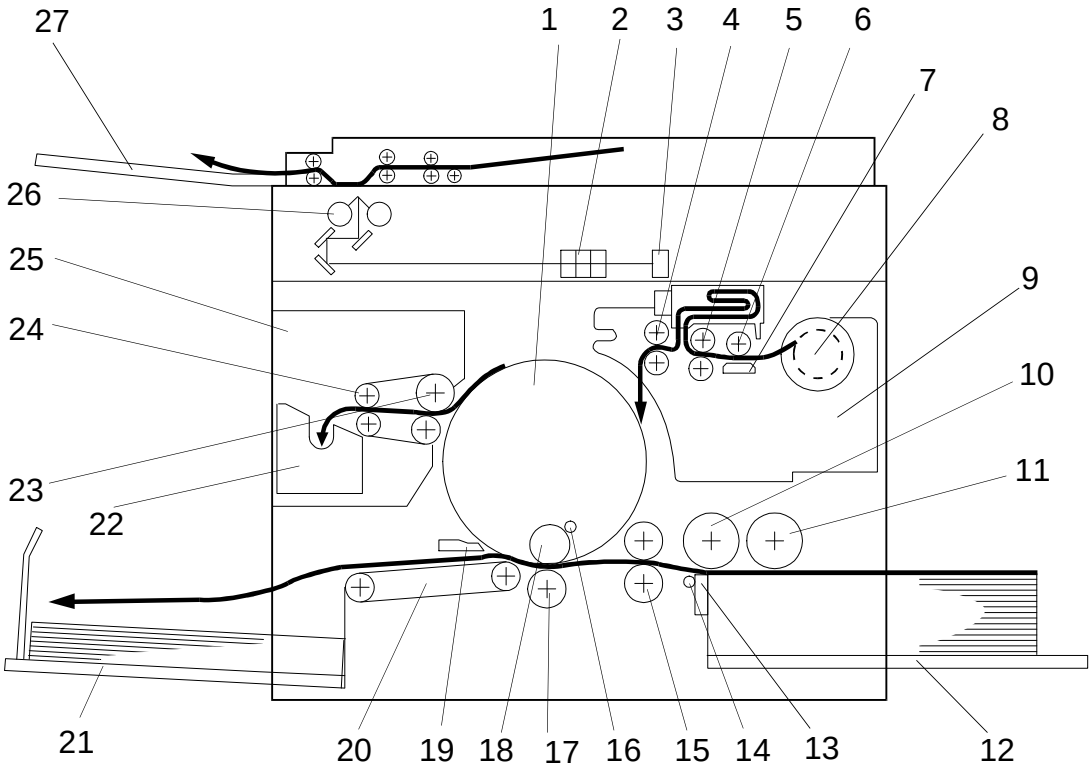
11. Paper Delivery End Plate
Use to align the leading edges of prints larger than A4, 8 1/2" x 11".

12. Paper Delivery Side Plates
Use to align the prints on the paper delivery table.

13. Master Eject Container Cover
Open when removing the master eject box.

14. Main Switch
Use to turn the power on or off.

3. MECHANICAL COMPONENT LAYOUT



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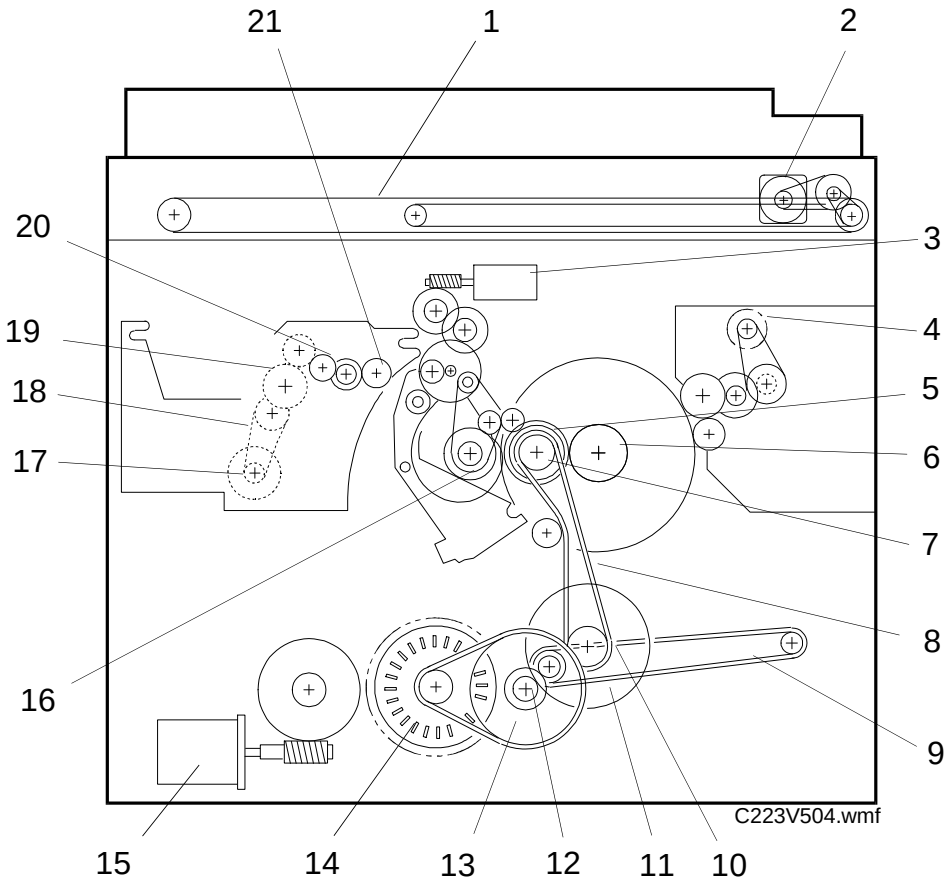
1. Drum Unit
2. Lens
3. CCD
4. Reverse Roller
5. Master Feed Roller
6. Platen Roller
7. Thermal Head
8. Master Roll
9. Master Making Unit
10. Upper Separation Roller
11. Paper Feed Roller
12. Paper Table
13. Separation Plate
14. Lower Separation Roller
15. 2nd Feed Roller
16. Doctor Roller
17. Press Roller
18. Ink Roller
19. Paper Exit Pawl
20. Transport Unit
21. Paper Delivery Table
22. Master Eject Box
23. 1st Eject Roller
24. 2nd Eject Roller
25. Master Eject Unit
26. Exposure Lamps
27. Original Exit Tray

4. DRIVE LAYOUT



1. Scanner Belt
2. Scanner Motor
3. Image Position Motor
4. Master Eject Motor
5. Drum Drive Gear
6. Drum Unit Gear
7. Drum Drive Pulley
8. Main Drive Belt
9. Transport Belt
10. Printing Pressure Pulley
11. Printing Pressure Gear
12. Idle Gear
13. Idle Pulley
14. Main Motor
15. Paper Table Drive Motor
16. Paper Feed Cam Gear
17. Master Feed Motor
18. Timing Belt
19. Platen Roller Gear
20. Master Transport Roller Gear
21. Reverse Roller Gear

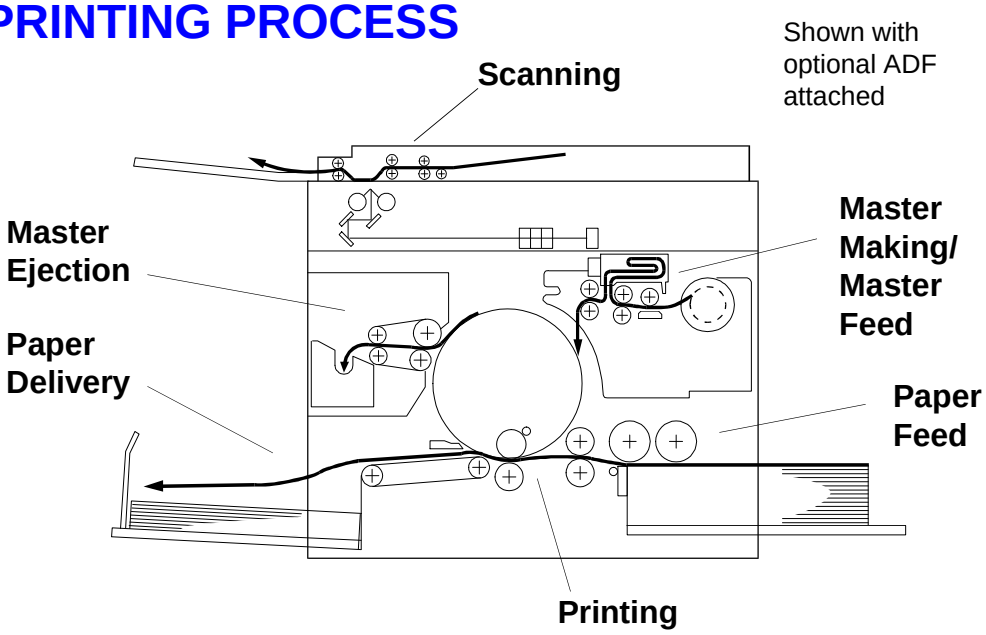
5. ELECTRICAL COMPONENT DESCRIPTIONS

INDEX No.	NAME	FUNCTION
Motors		
15	Vacuum Fan Motor	Provides suction so that paper is held firmly on the transport belt.
37	Main Motor	Drives paper feed, drum printing, and paper delivery unit components.
40	Paper Table Drive Motor	Raises and lowers the paper feed table.
45	Image Positioning Motor	Changing the relative timing of the paper feed roller and the drum to adjust the vertical image position.
51	Master Feed Motor	Feeds the master to the drum.
53	Master Buffer Fan Motor	Provides suction so that the master is stored in the master box during the master eject operation.
54	Pressure Plate Motor	Raises and lowers the pressure plate in the master eject mechanism.
60	Air Knife Motor	Drives the fan to separate the paper's leading edge from the drum.
62	Master Eject Motor	Sends the used master into the master eject box.
64	Cutter Motor	Drives the mechanism that cuts the master.
70	Scanner Motor	Drives the 1st and 2nd scanners.
Solenoids		
31	Ink Supply Solenoid	Releases the spring clutch to activate the ink supply pump.
32	Master Press Sheet Solenoid	Inserts the mylar sheet between the press roller and the drum during a quality start operation.
36	Printing Pressure Solenoid	Engages the pressure on/off lever when a paper misfeed occurs.
39	Paper Feed Solenoid	Releases the sector gears to feed the paper.
41	Detection Pin Release Solenoid	Releases the detection pin arm to apply printing pressure during a quality start operation.
46	Master Feed Clamper Solenoid	Open the master clamper to catch the master during master feed.
47	Drum Lock Solenoid	Prevents the drum unit from being removed during a printing run.
48	Master Eject Clamper Solenoid	Open the master clamper to eject the master.
59	Master Eject Solenoid	Presses the lower master eject roller against the drum surface.
Switches		
1	Scanner Unit Safety Switch	Cuts off the power line of the main and paper table drive motors when the scanner unit is open.
2	Paper Table Down Button	Instructs the CPU to turn on the paper table drive motor to lower the paper table.
5	Paper Table Open Switch	Checks whether the paper table is opened or not.

INDEX No.	NAME	FUNCTION
7	Paper Table Safety Switch	Stops lowering the paper feed table to prevent users from catching their fingers under it, by cutting the ac power. It also closes when the paper feed table is closed.
12	Front Door Safety Switch	Informs the CPU when the front door is open, and cuts off the power line to the paper table drive motor.
18	Test Switch	Disables the front door, paper table, master eject unit, and scanner unit safety switches.
20	Delivery Table Open Switch	Checks whether the delivery table is open or not.
21	Main Switch	Turns the power on or off.
22	Air Knife Motor Safety Switch	Cuts off the power line of the air knife motor when the master eject unit is open.
27	Drum Rotation Button	Instructs the CPU to rotate the drum at 10 rpm.
28	Drum Unit Safety Switch	Checks whether the drum unit is set correctly or not.
30	Master Eject Unit Safety Switch	Cuts off the power line when the master eject unit is open.
44	Master Cut Button	Instructs the CPU to feed a short strip of master paper and cut the master paper.
52	Left Cutter Switch	Detects when the cutter position is at the far left (operation side).
61	Master Eject Box Switch	Checks whether the master eject box is set properly.
66	Right Cutter Switch	Detects when the cutter position is at the far right (non-operation side).
76	ADF Set Switch	Detects if the optional document feeder is closed.
Sensors		
3	Paper End Sensor	Informs the CPU if there is paper on the paper table.
4	Paper Width Sensors	Informs the CPU of the printer paper width.
6	Paper Length Sensor	Informs the CPU of the printer paper length.
8	Paper Table Height Sensor	Informs the CPU if the paper table is at the paper feed position.
11	Paper Table Lower Limit Sensor	Informs the CPU if the paper table is at the lowest position.
13	Printing Pressure Sensor	Informs the CPU if printing pressure is applied. Also, detects paper misfeeds.
14	1st Paper Exit Sensor	Detects paper misfeeds.
17	2nd Paper Exit Sensor	Detects paper misfeeds.
33	2nd Drum Position Sensor	Checks the position of the drum.
35	1st Drum Position Sensor	Checks the position of the drum.
38	Drum Rotation Sensor	Supplies timing pulses to the CPU based on the main motor speed.
49	Drum Master Sensor	Informs the CPU if there is a master on the drum.
50	Master Buckle Sensor	Informs the CPU if the master is buckling.
55	Lower Pressure Plate Sensor	Informs the CPU if the pressure plate in the master eject mechanism is at the lower limit position.
56	Upper Pressure Plate Sensor	Informs the CPU if the pressure plate in the master eject mechanism is at the upper limit position.

INDEX No.	NAME	FUNCTION
57	Full Master Box Sensor	Informs the CPU whether the master eject box is full of masters or not.
58	Master Eject Sensor	Detects used master misfeeds.
65	Master End Sensor	Informs the CPU when the master roll in the master making unit runs out.
68	Scanner Home Position Sensor	Informs the CPU when the 1st scanner is at home position.
72	Platen Cover Position Sensor	Detects when the platen cover or the optional document feeder is opened more than 25 degrees above the exposure glass.
75	Original Sensor	Detects if an original is placed on the exposure glass.
Printed Circuit Boards		
9	Image Processing PCB	Control the image processing performance.
29	Main Control PCB	Controls all machine functions both directly and through other boards.
42	AC Drive PCB	Controls the ac components using relays.
43	Ink Detection PCB	Informs whether ink is present in the drum.
71	CCD PCB	Converts light intensity into an electrical signal.
74	A/D Conversion PCB	Converts analog signals into digital signals.
Counters		
23	Master Counter	Keeps track of the total number of masters made.
24	Total Counter	Keeps track of the total number of prints made.
Others		
10	Transformer	Steps down the wall voltage.
16	Power Supply Unit	Provides power for all dc components.
19	Circuit Breaker	Cuts the ac line off.
25	Operation Panel	Interfaces the CPU and the operator.
26	Drum Rotation LED	Turns to green from red when the drum stops at the home position.
34	Noise Filter	Filters out electrical noise from the ac power input line.
63	Reverse Roller Clutch	Transfers drive to the reverse roller.
67	Thermal Head	Creates the master using heat.
69	Xenon Lamp	Illuminates the original.
73	Xenon Lamp Stabilizer	Stabilizes the power supplied to the xenon lamp.

6. PRINTING PROCESS



C223V500.wmf

1. Master Ejection/ Scanning/ Master Making:

   At the start of the printing run, the machine ejects the used master wrapped around the drum into the master eject box.

   At the same time, the machine scans the original on the exposure glass (reflected light goes to the CCD via the mirrors and the lens. The scanned image is transferred to the master using a thermal head.

   While the old master is still being ejected, the new master is stored in a box.

2. Master Feed:

   After the old master has been ejected, the new master is fed to the drum and wrapped around it. At the same time, the master is cut off from the roll.

3. Paper Feed:

   Individual sheets of paper are fed to the drum.

4. Printing:

   The paper fed from the paper feed mechanism is pressed onto the drum. This transfers ink to the printer paper through the drum screen and the master.

5. Paper Delivery:

   The exit pawl and air knife peel off the printout, and the printout is ejected onto the paper delivery table.

7. MAJOR DIFFERENCES BETWEEN THE C218 AND THE C223 MODELS

The C223 model was developed based on the C218 model.

The following table lists the major differences between the C223 and the C218 models.

No.	Item	Remarks
1	Exposure Lamp	The exposure lamp has been changed from a fluorescent lamp to two xenon lamps.
2	Master Buffer Mechanism	The master process time has been reduced as a result of the new master buffer mechanism. The master making process starts at the same time as the master eject operation starts.
3	Quality Start	A quality start mechanism has been added to minimize waste prints after a long idle interval.
4	Platen Roller Holding Method	To ensure correct platen roller positioning, the platen roller is held by two screws instead of two levers.
5	Leading Edge Margin	The leading edge margin has been reduced from 8 mm to 5 mm. The drum screens and printing pressure cam have been changed.
6	Separation Roller Shaft	The diameter of the separation roller shaft has been increased. Due to this modification, the paper feed vibration noise has been reduced.
7	Noise Reduction Cover	The noise reduction cover has been added to reduce paper feed noise.
8	Paper Size Sensors	The paper size detection board has been eliminated. The paper size sensors directly send signals to the main control board.
9	Optional Equipment	The following items have been newly lined up as the options for the C223 model: Sorter Stapler DS20A/DS20B DF II (50 sheets) Large Capacity Tray LT4000
10	Line/Photo Mode	To allow clear prints of originals having line and photo areas, Line/Photo mode has been added. Photo mode is processed using Error Diffusion, which is similar to the CAPIX method used in the C210 and C218 models.
11	Economy Mode	If "Economy" mode is selected on the operation panel, a lower thermal head energy is applied when a master is made. As a result, the image will be lighter than normal and ink consumption will be less.
12	CS Mode	Customers can register three of seven frequently used user SP modes in CS mode. The setting can be recalled using the CS mode key which is newly added.
13	Scanner Lock Lever	To facilitate operation, the shape of the scanner lock lever has been changed.
14	Paper Return Mechanism	The paper return mechanism (a solenoid and a dc motor) has been eliminated.

No.	Item	Remarks
15	Cassette Size Detection	The cassette size detection board (red switch) has been eliminated. (The cassette has been changed from standard equipment to an option).
16	Paper Feed Motor	The paper feed motor has been changed from an ac motor to a dc motor.
17	Original Tray Cover	To prevent the originals from dropping when the ADF is opened, a cover has been added on the original tray.
18	Base Pads	The shape of the base pads has been changed so that they can be used for both the normal table and the table for the LCT.

SECTION 2

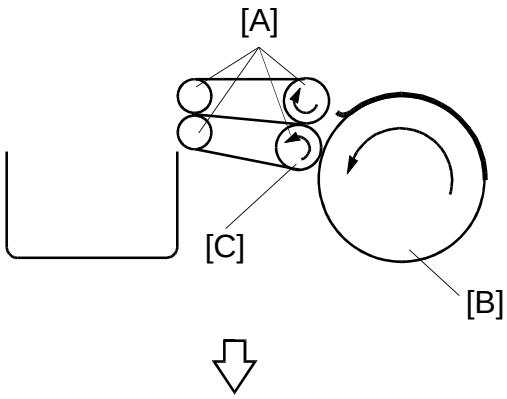
DETAILED SECTION DESCRIPTIONS

1. MASTER EJECT

1.1 OVERALL

At the end of the printing cycle, the used master remains wrapped around the drum to prevent the ink on the drum surface from drying. When the Master Making key is pressed to make a new master, the used master is ejected from the drum.

The master is pulled off the drum, then it goes through the eject rollers and into the master eject box. A pressure plate then compacts the used master.



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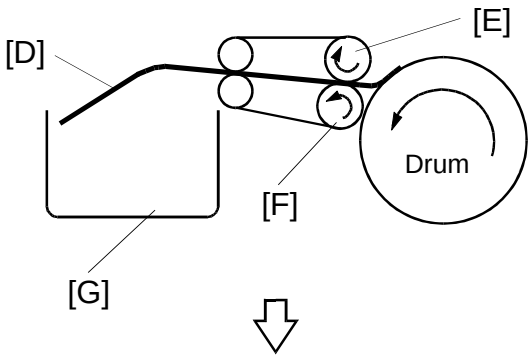
- The drum [B] rotates in reverse (opposite to the printing direction).
- The master eject rollers [A] rotate.
- The lower eject roller [C] is pressed against the drum.



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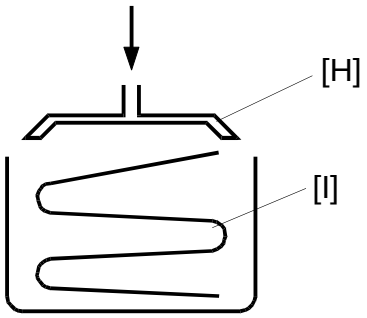
- The trailing edge of the master, which curls up from the drum, passes between the upper [E] and lower [F] eject rollers, and the master [D] is peeled off the drum and dumped into the master eject box [G].



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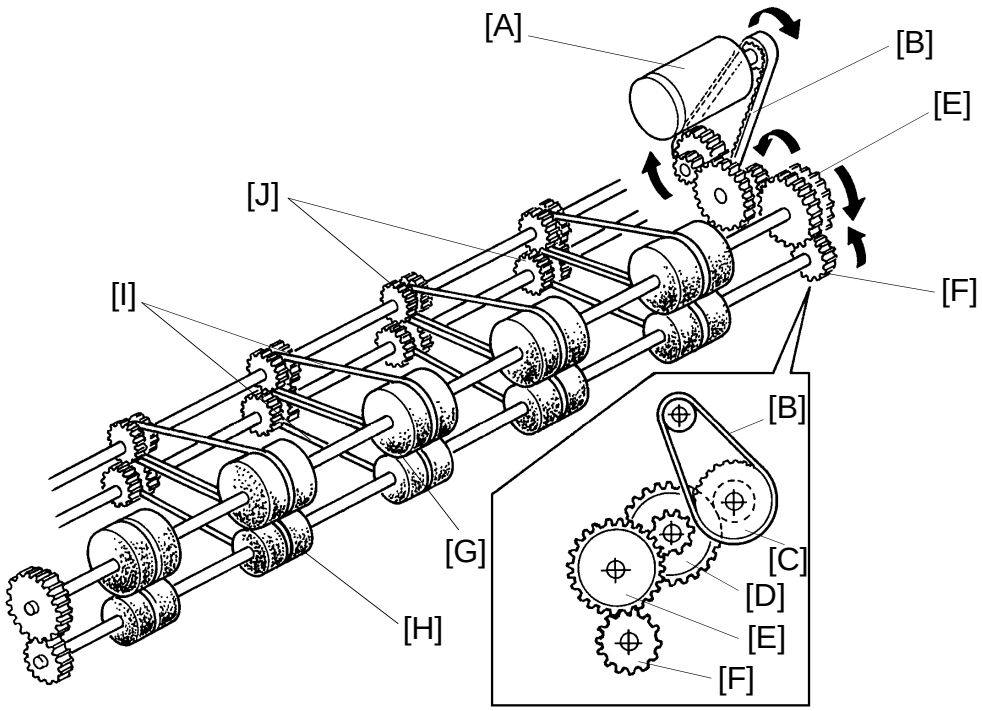
- The pressure plate [H] compacts the ejected master [I].

1.2 MASTER EJECT ROLLER ROTATION MECHANISM



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When an original is in place and the Master Making key is pressed, the main motor starts turning at 22 rpm in reverse. As a result, the drum also turns in reverse (compared with the rotation direction for printing).

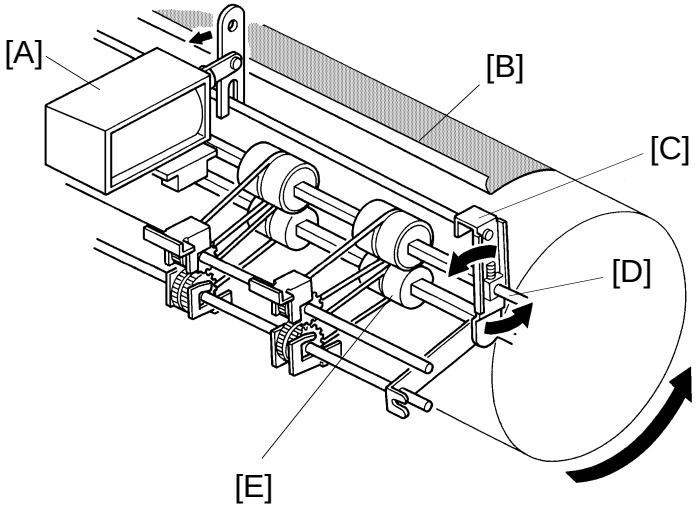
At this time, if the drum master sensor detects a master on the drum, the master eject motor [A] starts rotating. Drive is transmitted to gear [E] and to the upper first eject rollers [G] through the timing belt [B] and gears [C] and [D]. Gear [F] drives the lower first eject rollers [H]. The belts [I] transmit drive from the first eject rollers to the upper and lower second eject rollers [J].

(If the drum master sensor detects no master on the drum when the Master Making key is pressed, the machine skips the master eject process and goes directly to the master making process.)

After the master eject process is completed, the drum returns to its home position. The master eject rollers then stop rotating.

This model has four rollers on each eject roller shaft.

1.3 MASTER EJECT ROLLER DRIVE MECHANISM



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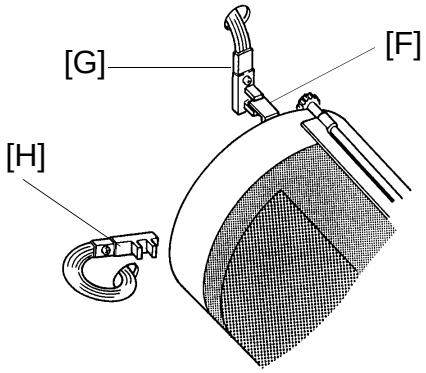

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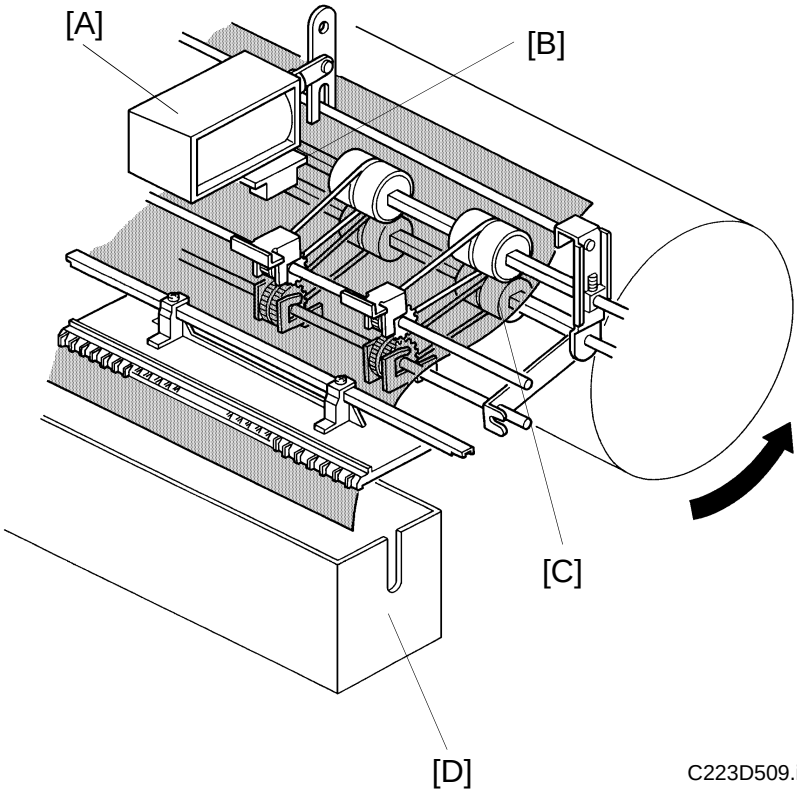
The drum position is detected by the first [G] and second [H] drum position sensors. When the drum reaches its home position, the first drum position sensor [G] is actuated by the interrupter [F] on the rear side of the drum.

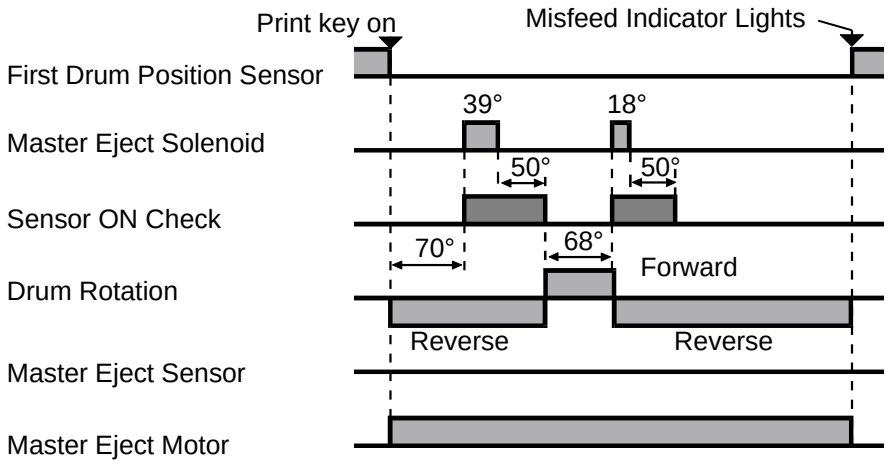
To eject the master, the drum turns in reverse (opposite to the printing direction). When the drum is 70° past the 1st drum position sensor, the master eject solenoid [A] turns on and the supporter [C] rotates counterclockwise on the upper eject roller shaft [D]. This forces the lower first eject roller [E] against the drum.

As the drum turns, the curled trailing edge of the master [B] passes between the upper and lower first eject rollers. The first eject rollers then peel the master from the drum.



When the drum is 109 degree past the 1st drum position sensor, the master eject solenoid [A] turns off, separating the lower first eject rollers [C] from the drum.

Shortly after the leading edge of the ejected master has passed between the upper and lower first eject rollers, the master eject sensor [B] is activated. The master is then dumped into the master eject box [D].



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[Master Eject Misfeed Detection]

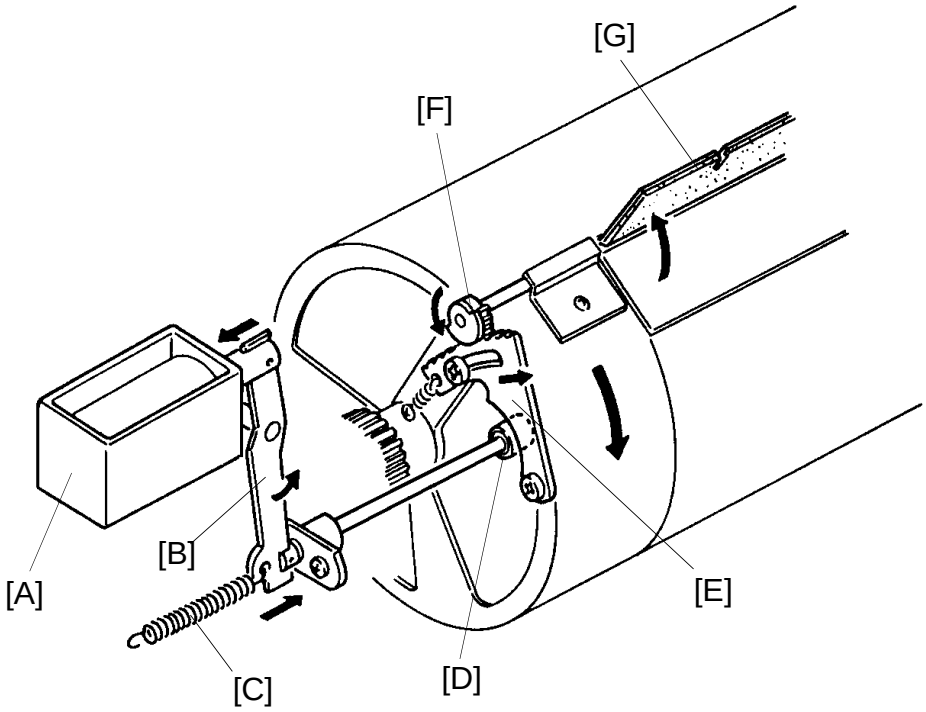
The misfeed indicator for the master eject section blinks in the following cases:

Case 1: The master eject sensor is not activated and the drum has turned 50 degrees more (still in reverse and after de-activation of the master eject solenoid). The machine knows that the eject rollers have failed to catch the master. So the drum returns 68 degrees (in the printing direction) to repeat the master eject process once again. The master eject solenoid is again energized while the drum turns another 18 degrees to try to catch the master.

If the master eject sensor once again fails to detect the master, then the drum returns to its home position and the misfeed indicator blinks.

Case 2: The drum finishes its rotation for the master ejecting process and returns to the home position, but the master eject sensor does not turn off. This means that the master is still in between the master eject rollers, the misfeed indicator blinks.

1.4 MASTER EJECT CLAMPER MECHANISM

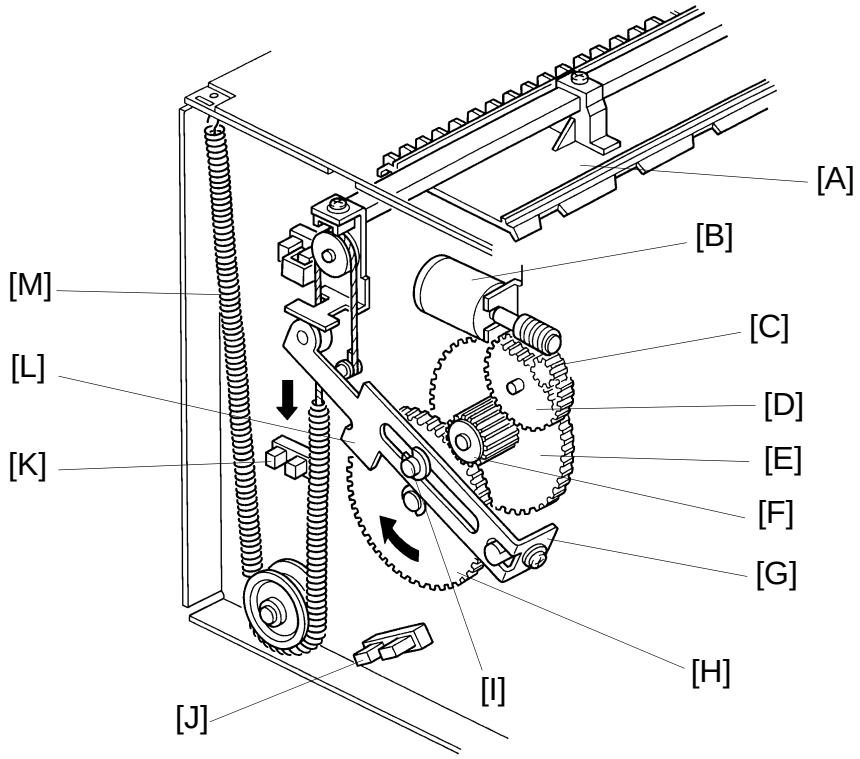


C223D513.img

When the drum has rotated 306° (in reverse) past the 1st drum position sensor, the master eject clamper solenoid [A] turns on and lever [B] moves counterclockwise a short way as shown. This moves the cam [D] inside the drum. Drum rotation brings the clamper sector gear [E] against the cam [D]. Gear [F] turns counterclockwise as it engages the clamper sector gear, thus opening the master clamper [G]. This releases the master from the drum.

The drum keeps on turning until the interrupter at the rear of the drum has gone 13 degrees past the first drum position sensor. Then, the main motor turns off. Half a second later, the master eject clamper solenoid [A] turns off and spring [C] pulls cam [D] back to its initial position. The drum then rotates forward to its home position.

1.5 PRESSURE PLATE UP/DOWN MECHANISM



C223D514.img

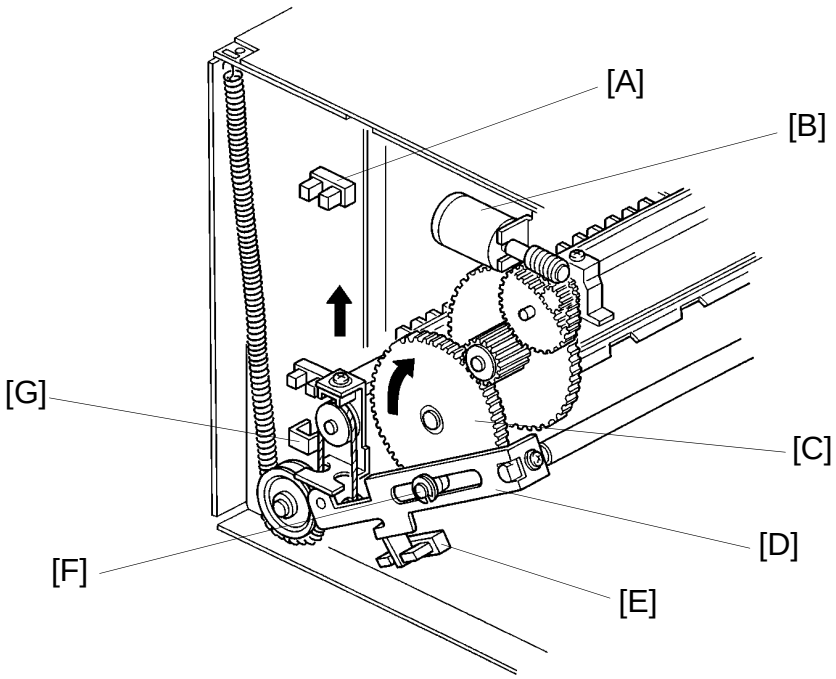
Pressure Plate Down

When the interrupter at the rear of the drum interrupts the first drum position sensor (this happens at the end of the master eject process), the pressure plate motor [B] starts. This drives gear [H] clockwise by means of gears [C], [D], [E], and [F].

Pin [I] on gear [H] moves link [G] down until the link interrupter [L] interrupts the lower pressure plate sensor [J]. Spring [M] pulls down on the pressure plate and the ejected master in the master eject box is compressed by the pressure plate [A].

If the master box full sensor [K] does not turn on when the pressure plate goes down, it means the master eject box is filled with ejected masters. In this case, the master eject box full indicator blinks, and the machine stops after a new master is wrapped around the drum.

The indicator goes out after the master eject box switch has been turned off and on. Then the master box full sensor is checked again after one master has been fed. This is to prevent the indicator from being reset without removing the ejected masters from the box. When the indicator is blinking, the Master Making key does not work, but the Print Start key and Proof key work so that the master currently on the drum can be used for printing.



C223D515.img

Pressure Plate Up

When the master has been wrapped around the drum in the master making process and the master cutter leaves the home position to cut the master, the pressure plate motor [B] starts rotating to raise the pressure plate.

When the pressure plate motor [B] turns, the gear [C] is driven through the relay gears. The pin [F] on the gear inserted into the link [D] rises and lifts the left end of the link, thus raising the pressure plate.

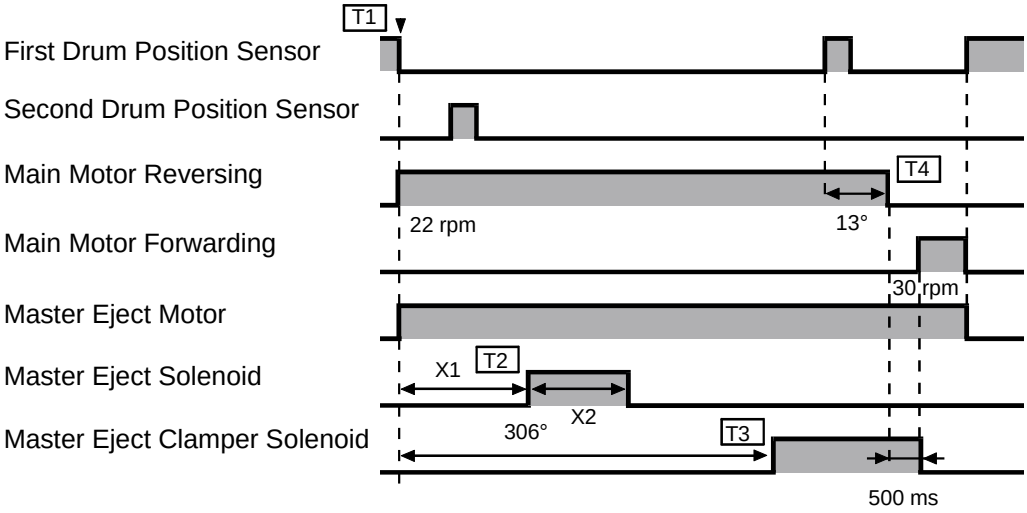
The gear [C] continues turning until the interrupter [G] at the front end of the pressure plate blocks the upper pressure plate sensor [A]. At this time, the master eject motor [B] stops and the pressure plate is held in the upper position.

Pressure Plate Motor Lock Detection

To prevent the pressure plate motor from locking, "E-12" lights up on the operation display panel under the following conditions:

1. When the lower pressure plate sensor [E] is not activated within 8 seconds after the pressure plate motor starts to lower the pressure plate.
2. When the upper pressure plate sensor [A] is not activated within 4 seconds after the pressure plate motor starts to raise the pressure plate.

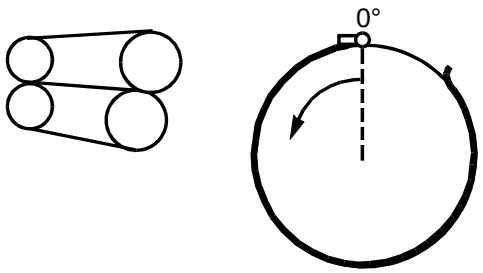
1.6 ELECTRICAL TIMING



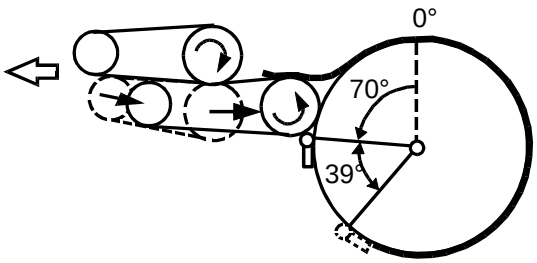
C223D516.wmf

T1: When the Master Making key is pressed, the main motor and master eject motor start turning. At the same time, the paper table drive motor starts turning to lift the paper table to the paper feed position.

T2: When the drum rotates X1 degrees past the first drum position sensor actuation position (drum home position), the master eject solenoid is energized. This presses the lower eject rollers against the drum surface. The master eject solenoid is de-energized when the drum rotates X2 degrees more.



C223D612.wmf

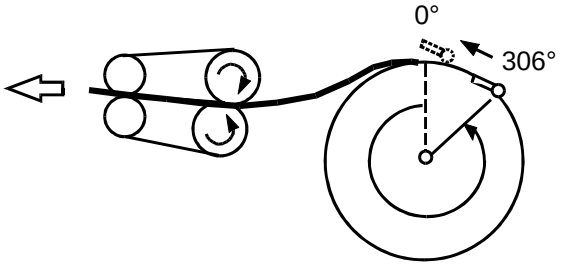


C223D613.wmf

The drum rotation angles X1 and X2 depend on the drum type. This machine has two types of drums: one is the A3/DLT drum (standard), and the other is the A4/LT drum (optional). X1 and X2 for each drum are as follows

Drum Type	A3/DLT	A4/LT
X1 (degree)	70	174
X2 (degree)	36	55

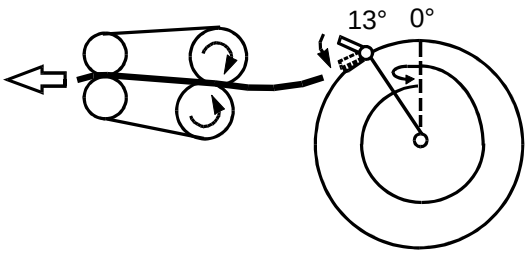
T3: When the drum rotates 306 degrees past the home position, the master eject clamper solenoid is energized.



C223D614.wmf

T4: When the drum rotates 13 degrees past the drum home position, the drum stops rotating.

500 milliseconds later (the drum completely stops during this period), the master eject clamper solenoid is de-energized and the drum starts rotating forward. The drum then returns to its home position. The master eject process is now over.



C223D615.wmf

Soon after this, the machine starts feeding a new master and the drum starts rotating in reverse to begin the master making process.

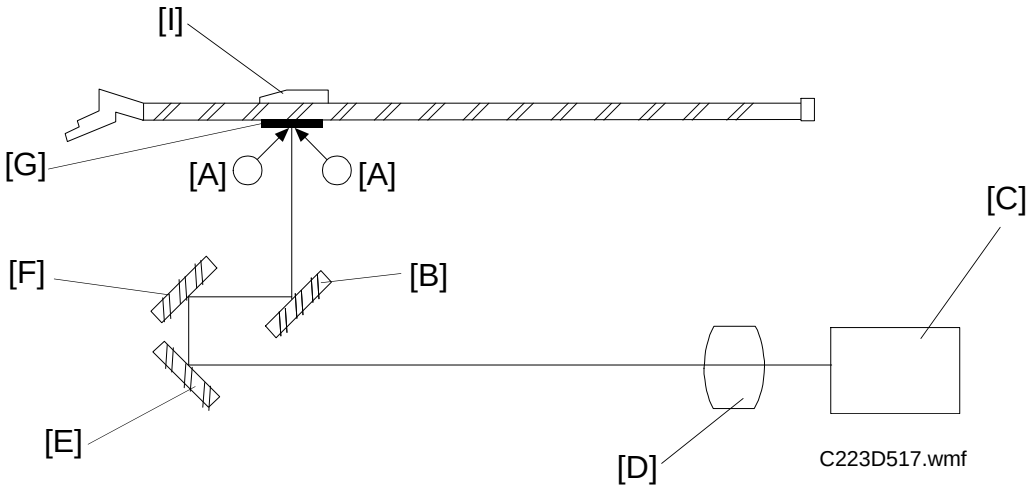
2. SCANNER

2.1 OVERALL

A book type scanner is used for the #C223 model. There are two modes for scanning originals.

Platen Cover Mode: The original is placed on the exposure glass, and the scanner motor drives the scanner to scan the original.

ADF Mode: When an optional Document Feeder is installed, the original is fed onto the exposure glass. The scanner moves 22 mm away from the CCD and remains still as it scans the original. The scanner comes back to the home position when the scanning is finished.

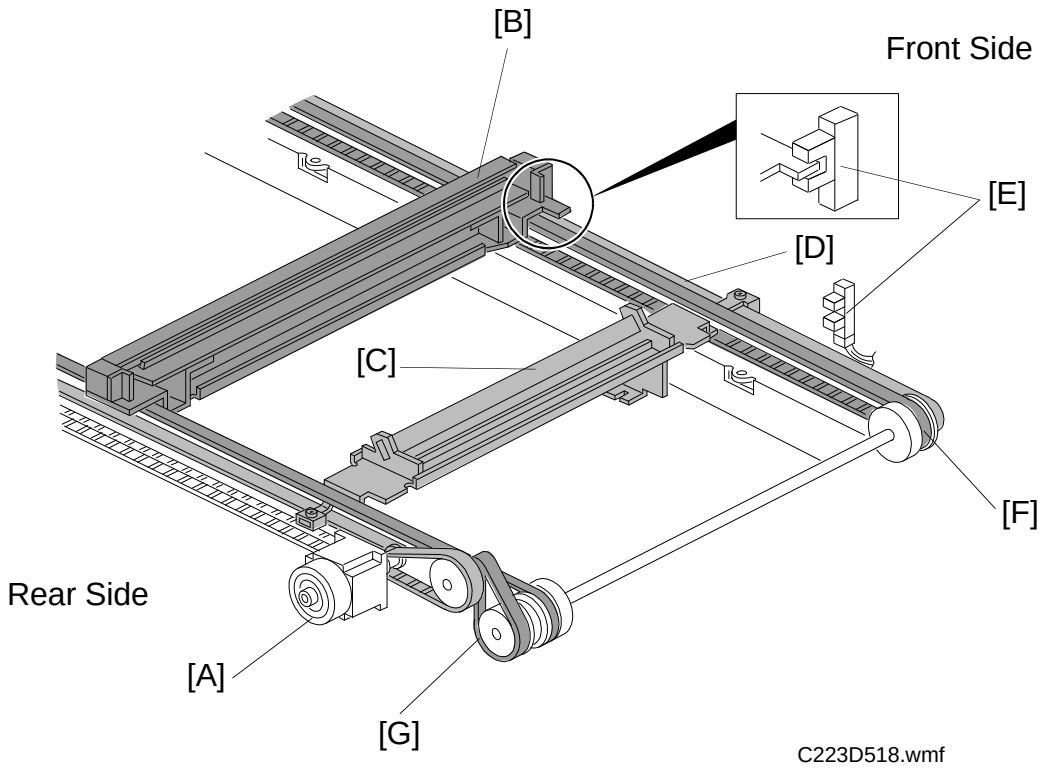


The light from the xenon lamps [A] is reflected from the original by the first [B], second [F], and third [E] mirrors through the lens [D] to the CCD [C].

In the Platen Cover Mode, the CCD reads the white plate [G] on the back of the original scale [I] each time before scanning to obtain a standard white level. The standard white data are used to correct distortion. The scanner is at its home position when it reads the white level.

In the ADF mode, as the scanner moves 22 mm, the CCD reads the white plate installed on the ADF.

2.2 SCANNER MECHANISM

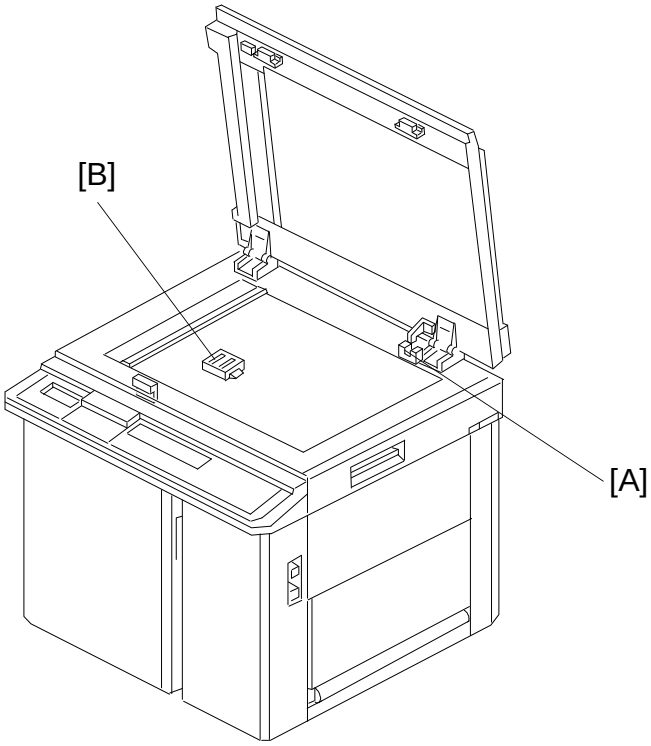


The scanner motor [A] (a stepper motor) drives the scanners. The first scanner [B], which consists of the exposure lamp and the first mirror, is driven by the first scanner belt [F]. The second scanner [C], which consists of the second and third mirrors, is driven by the second scanner belt [D]. Both scanners move along the guide rails.

The timing belt [G] moves the second scanner at half the speed of the first scanner. This is to maintain the focal distance between the original and the lens during scanning.

The scanner home position is detected by the scanner home position sensor [E]. In the Platen Cover Mode, the scanner scans the original on the exposure glass for the full A3/DLT length, then returns until the scanner home position sensor is activated. In the ADF Mode, the scanner moves 22 mm backwards (away from the CCD), to scan the original which is fed by the ADF. When the master making process is finished and the ADF motor stops, the scanner goes back to the home position.

2.3 PLATEN COVER POSITION DETECTION



C223D519.wmf

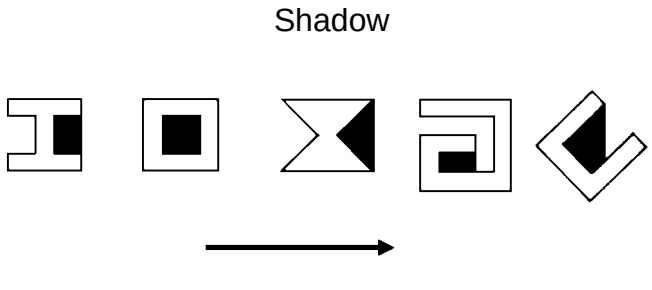
When the platen cover is opened about 25 degrees, the Platen Cover Position Sensor [A] is deactivated. When this sensor is deactivated, the Original Sensor [B] is able to detect the original on the exposure glass.

When the Platen Cover Position Sensor is deactivated and the Original Sensor detects no original on the exposure glass, the machine indicates "SET THE ORIGINALS" on the operation display. This is to prevent wasting of the master that would occur when the Master Making key is pressed with no original placed on the exposure glass.

When the original is placed on the exposure glass and the Master Making key is pressed with the platen cover opened more than 25 degrees (as the Platen Cover Position Sensor is deactivated), the shadow erase function is enabled.

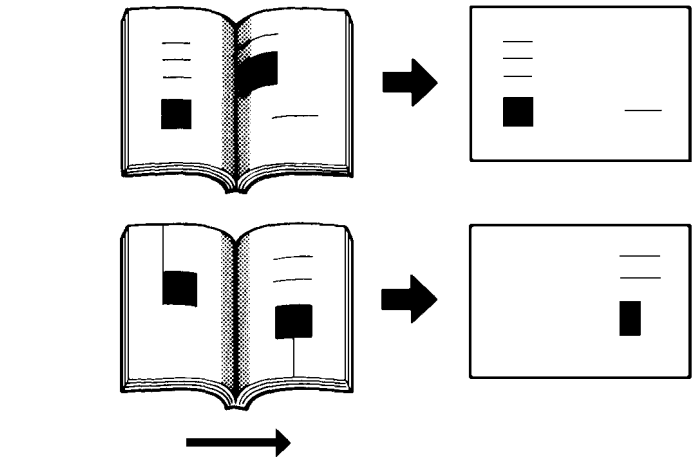
Notes regarding the shadow erase function

- Margins of 1 mm [0.02"] on all four sides of the original will be erased. The width of the margins will change depending on the reproduction ratios.
- Shadows near the edge of a book might not be erased completely.
- If the shape of the original is as shown below, shadows might appear on the prints. In this case, make the master with the platen cover closed.



C223D520.img

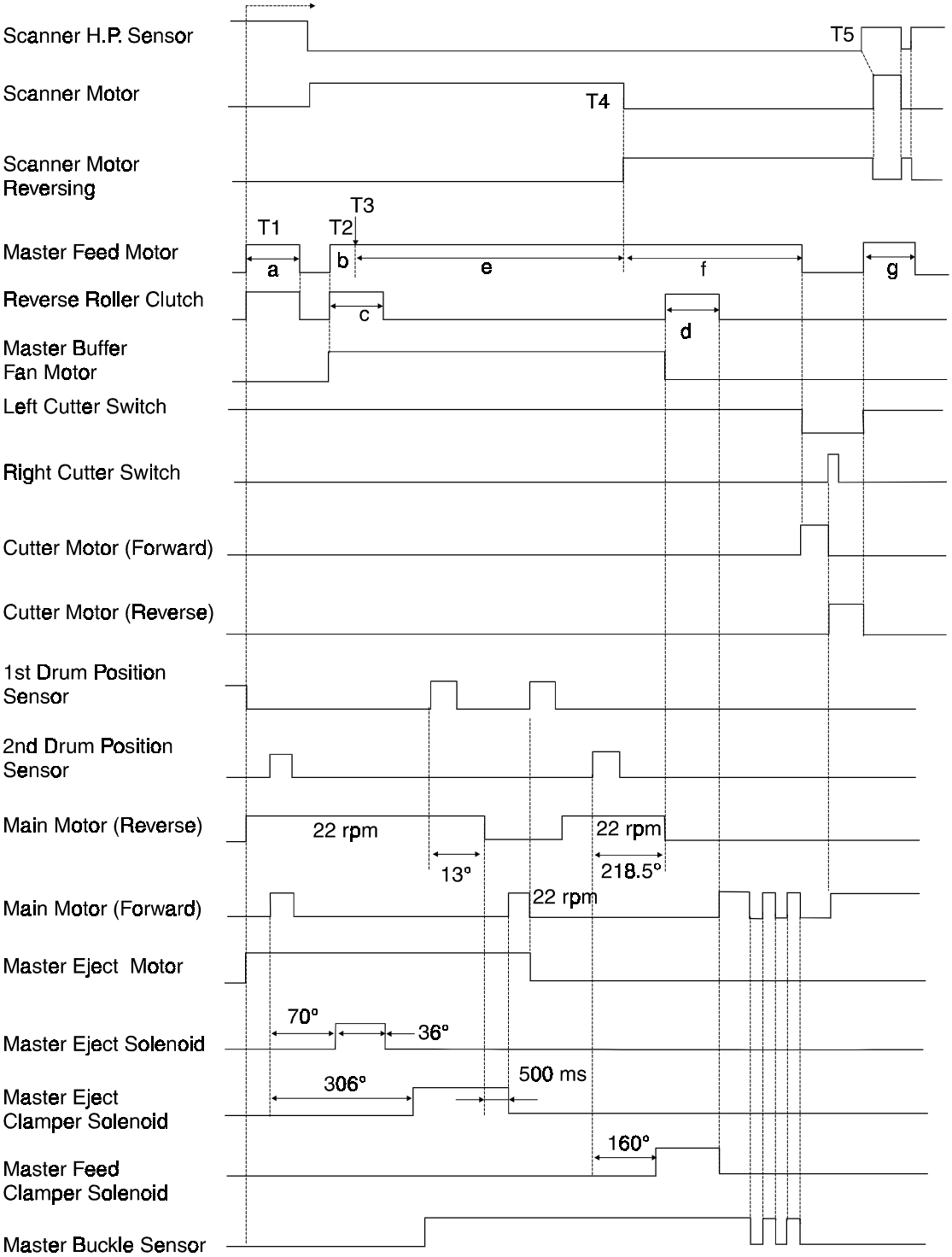
- If there is a line or solid image on the margin at the center or at the edges being erased, parts of the image might be erased as shown below.



C223D521.img

2.4 ELECTRICAL TIMING

2.4.1 Platen Mode



C223D522.wmf

Master Feed Lengths

a: 18.7 mm
b: 0.7 mm
c: 10.7 mm
d: 13.7 mm
e: 420 mm
f: 62.5 mm (211 mm: A4/LT drum)
g: 40 mm (61 mm: A4/LT drum)

The timing chart shows how scanning takes place at the same time as master ejection and master making.

T1: When the master making key is pressed, the main motor starts reverse rotation at 22 rpm. At the same time, the master feed motor and the reverse roller clutch turn on to feed the master 18.7 mm. Then they switch off, and the scanner motor turns on shortly afterwards.

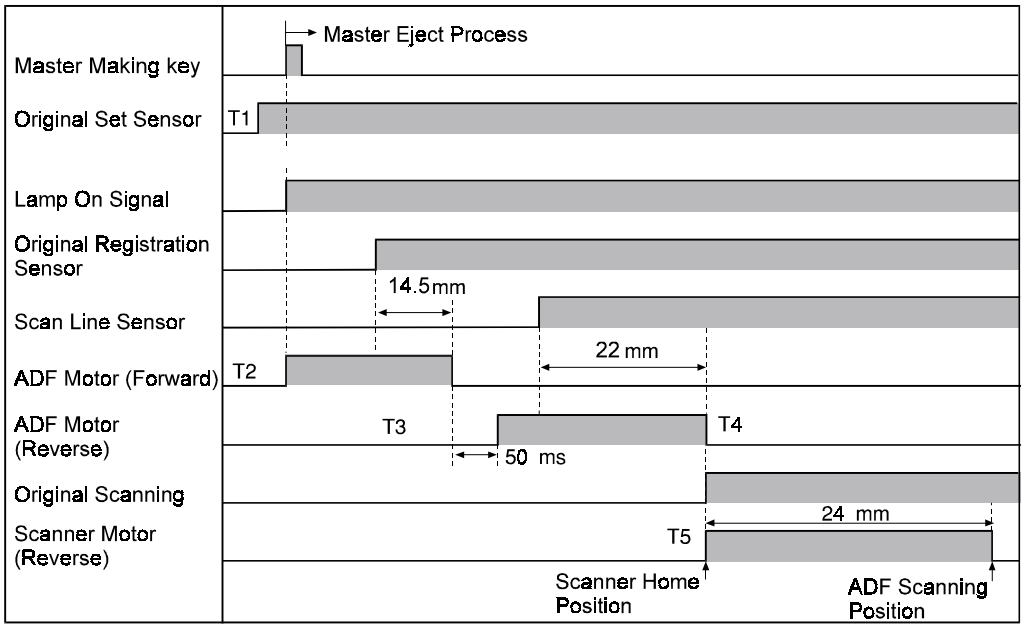
T2: When the scanner has moved 20 mm from the home position, the master feed motor, master buckle fan motor, and the reverse roller clutch turn on.

T3: The thermal head starts to make the new master when the master has been transported 1mm.

T4: When 420 mm (the maximum scan length) has been scanned the scanner motor starts reversing to return the scanner to the home position.

T5: After the scanner home position sensor has been actuated, the scanner motor rotates forward then reverses to stop the scanner at the correct home position.

2.4.2 ADF Mode



C223D611.wmf

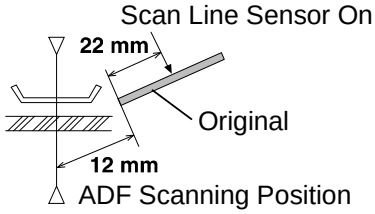
The above timing chart shows scanner timing when an optional ADF has been installed.

T1: When originals are inserted in the ADF unit, the original set sensor is activated.

T2: When the Master Making key is pressed, the ADF motor rotates the pickup roller and the feed roller to feed the bottom original into the ADF.

T3: The ADF motor stops rotating clockwise when the original has been fed 14.5 millimeters after the original registration sensor was activated. After 50 milliseconds, the ADF motor starts rotating counterclockwise to rotate the 1st original transport roller.

T4: The ADF motor stops again when the original has been fed 22 millimeters after the scan line sensor was activated.

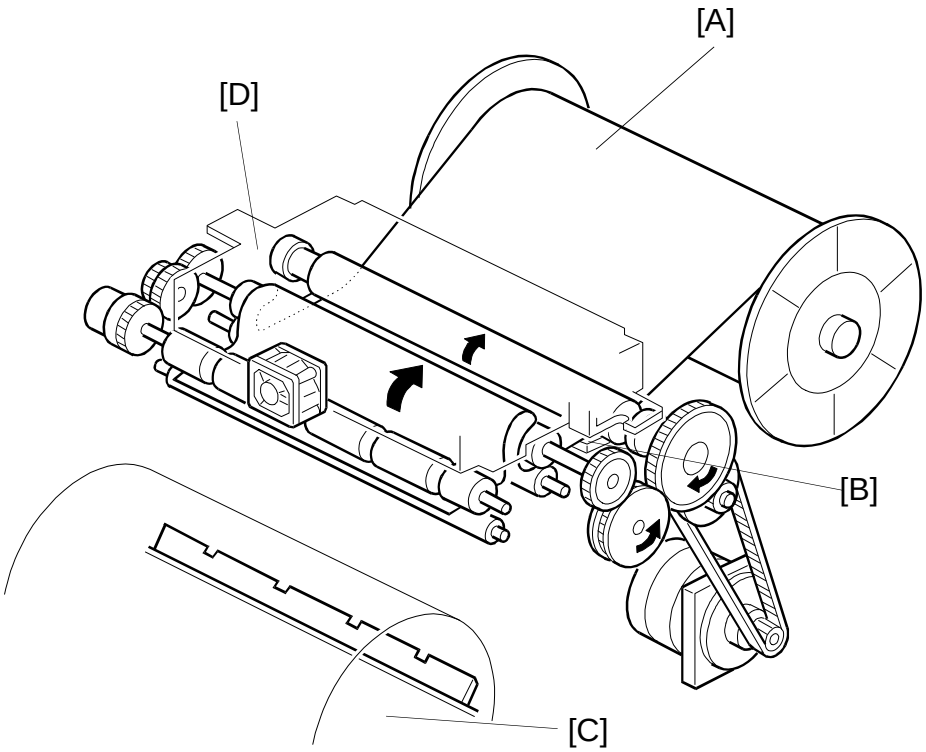


C223D610.wmf

T5: When the ADF motor stops, the scanner motor starts reversing to bring the scanner to the ADF scanning position.

3. MASTER FEED

3.1 OVERALL

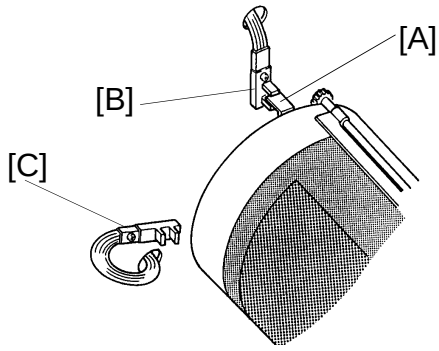


C223D500-1.wmf

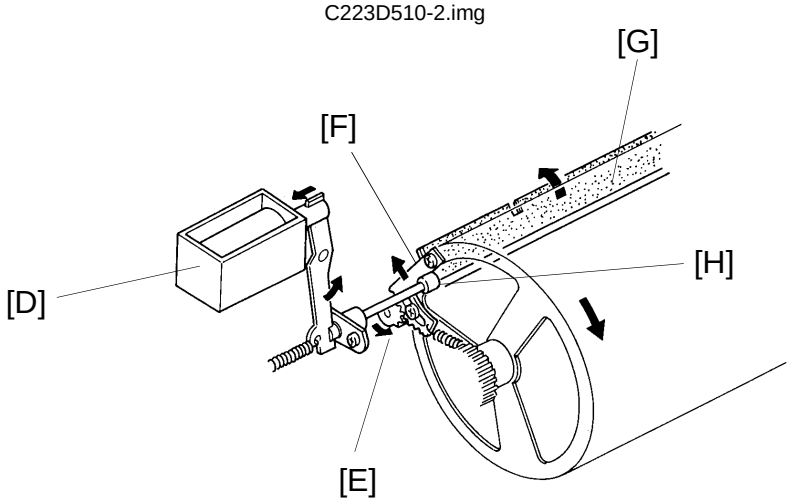
The thermal head [B] burns the image (scanned by the CCD) onto the master [A] as it is being fed to the drum [C]. The used master is ejected at the same time that the new master is printed, and the new master is stored in the master box [D] until the old master has been completely ejected. The master is then clamped to and wrapped around the drum.

The master box mechanism reduces the amount of time needed to make a new master, because the new master can be made at the same time that the old one is fed out.

3.2 MASTER FEED CLAMPER OPENING MECHANISM



C223D510-2.img



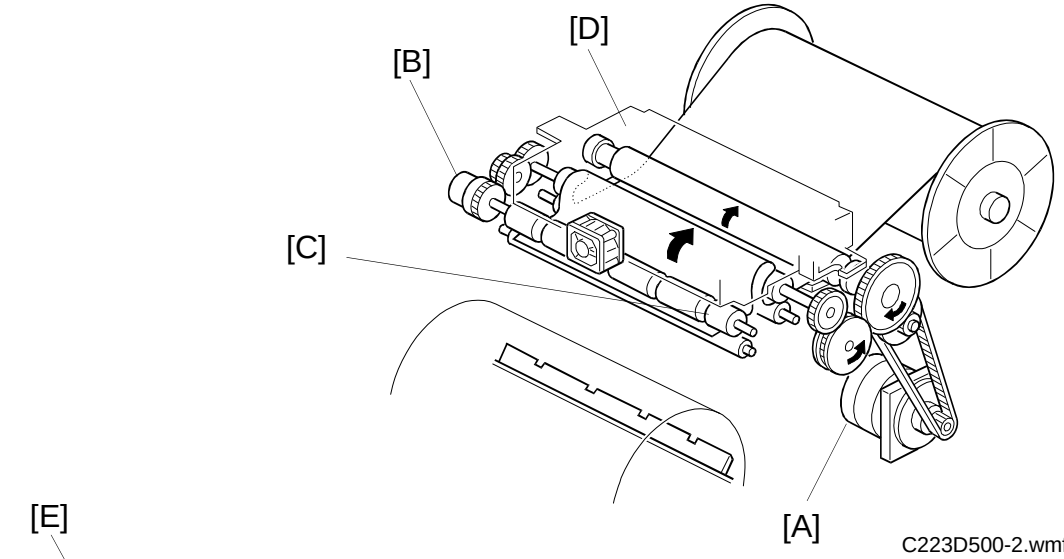
C223D526.img

After the master eject process is finished and the interrupter [A] is positioned in the first drum position sensor [B], the main motor turns on and the drum starts rotating (22 rpm) in reverse (opposite to the printing direction).

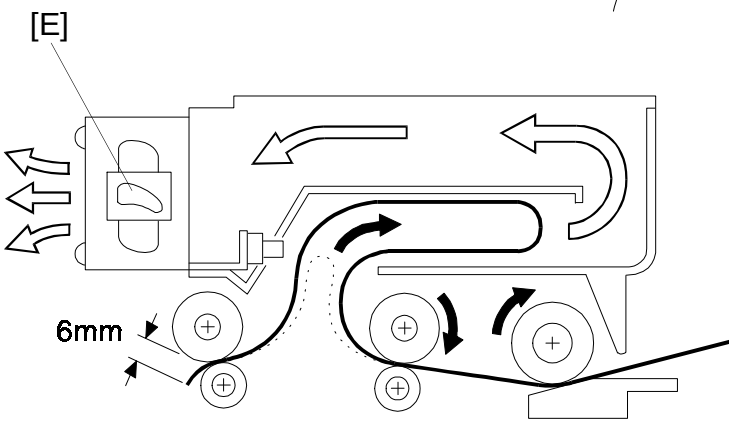
When the drum has turned 160 degrees past the actuation position of the second drum position sensor [C], the master feed clamper solenoid [D] turns on, and the cam [H] moves inside the drum.

When the drum has turned another 58.5 degrees, the sector gear [F] rotates upwards as it contacts the cam [H]. This engages the sector gear with gear [E], which turns counterclockwise to open the clamper [G]. At the same time, the drum stops and the clamper remains open to catch and clamp the master's leading edge.

3.3 MASTER FEED MECHANISM



C223D500-2.wmf



C223D501.wmf

To minimize the first print time, the master making process starts just after the master making key is pressed.

When the master making key is pressed, the drum starts rotating in reverse to eject the master that is wrapped around the drum. At the same time, the master feed motor [A] starts turning and the reverse roller clutch [B] is energized.

When the master has been transported 18.7 mm, the master feed roller and the reverse roller clutch stop. They start again just after original scanning starts.

When the master has been transported a further 10.7 mm (when the leading edge is 6 mm past the reverse roller [C]), the reverse roller clutch is turned off but the master feed motor continues to rotate. As a result, the master leading edge stays at 6 mm past the reverse roller, and the master buckles up behind

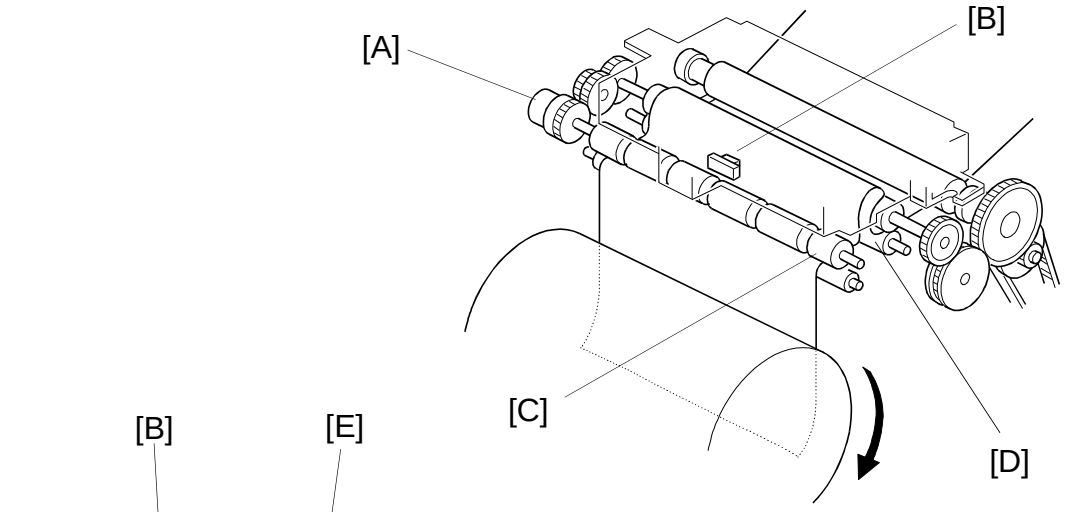
the reverse roller. Until the drum comes to the master feed position, the new master fed by the master feed motor during the eject process is stored in the master box [D]. The suction provided by the master buffer fan motor [E] helps to bring the master into the box.

The main results of this mechanism are:

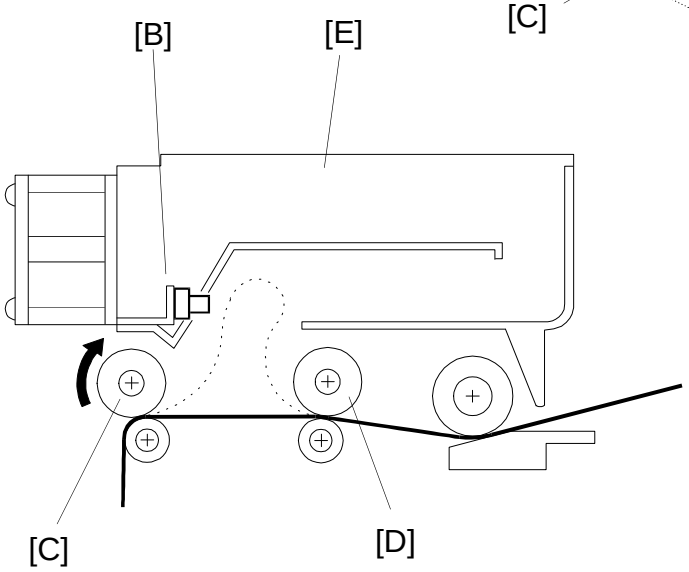
- A much greater length of new master can be made before it starts to be wrapped around the drum.
- The new master can start to be made much earlier during the machine's operation cycle, saving time.

The master buffer fan motor turns on when master making starts, and it stays on until the reverse roller starts feeding the master again to be caught by the master clamp on the drum.

3.4 MASTER WRAPPING MECHANISM



C223D502.wmf



C223D503.wmf

When the drum stops at the master feed position (at this time, the master clamper is open), the reverse roller clutch [A] turns on again. When the master has been transported 18.7 mm and the master leading edge has reached the master clamper, the reverse roller clutch and the master feed clamper solenoids turn off. The master leading edge is clamped by the master clamper.

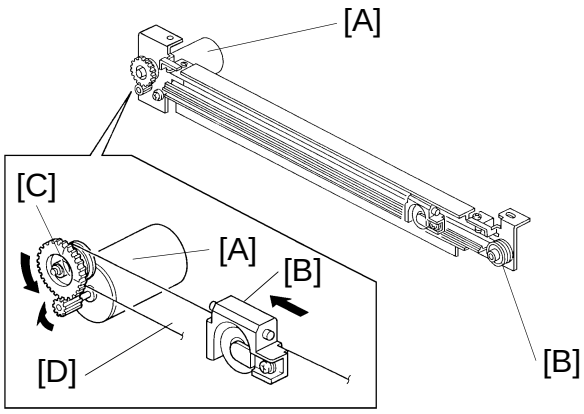
After the master clamper catches the master leading edge, the drum rotates at 22 rpm while the master buckle sensor [B] is on. The master feed motor continues to feed the master at this stage. The drum pulls the master faster than the master feed motor feeds it, so the master buckle sensor will deactivate eventually. When this happens, the main motor stops until the sensor is activated by the master buckle again. In this way, the master is wrapped around the drum keeping a buckle between the reverse roller [C] and the master feed roller [D]. This buckle prevents the master that is still

under the thermal head from being pulled; if a long master is being made, this will adversely affect copy quality.

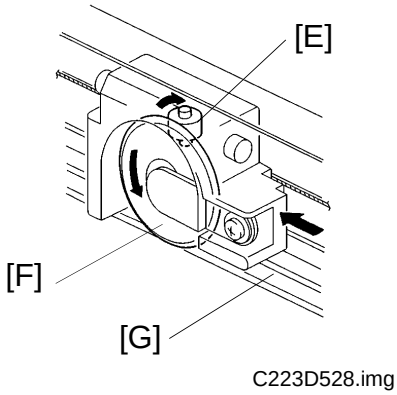
When the new master is finished, the master feed speed increases (to 4 times the master making speed) and the master cutter cuts the master when the appropriate length of master has been transported.

Even if a master eject jam occurs, the master making operation continues. When a master eject jam is detected, the machine stops after master making and cutting is done (during this period, the new master is stored in the master box [E]). When the reset key is pressed after the jammed master is removed, the reverse roller clutch turns on to transport the master to the master clamper, and the master clamper clamps the leading edge. The drum rotates at 22 rpm to wrap the master.

3.5 CUTTER MECHANISM



C223D527.img



C223D528.img

After the master making process is finished, the master feed motor turns off and the cutter motor [A] starts turning.

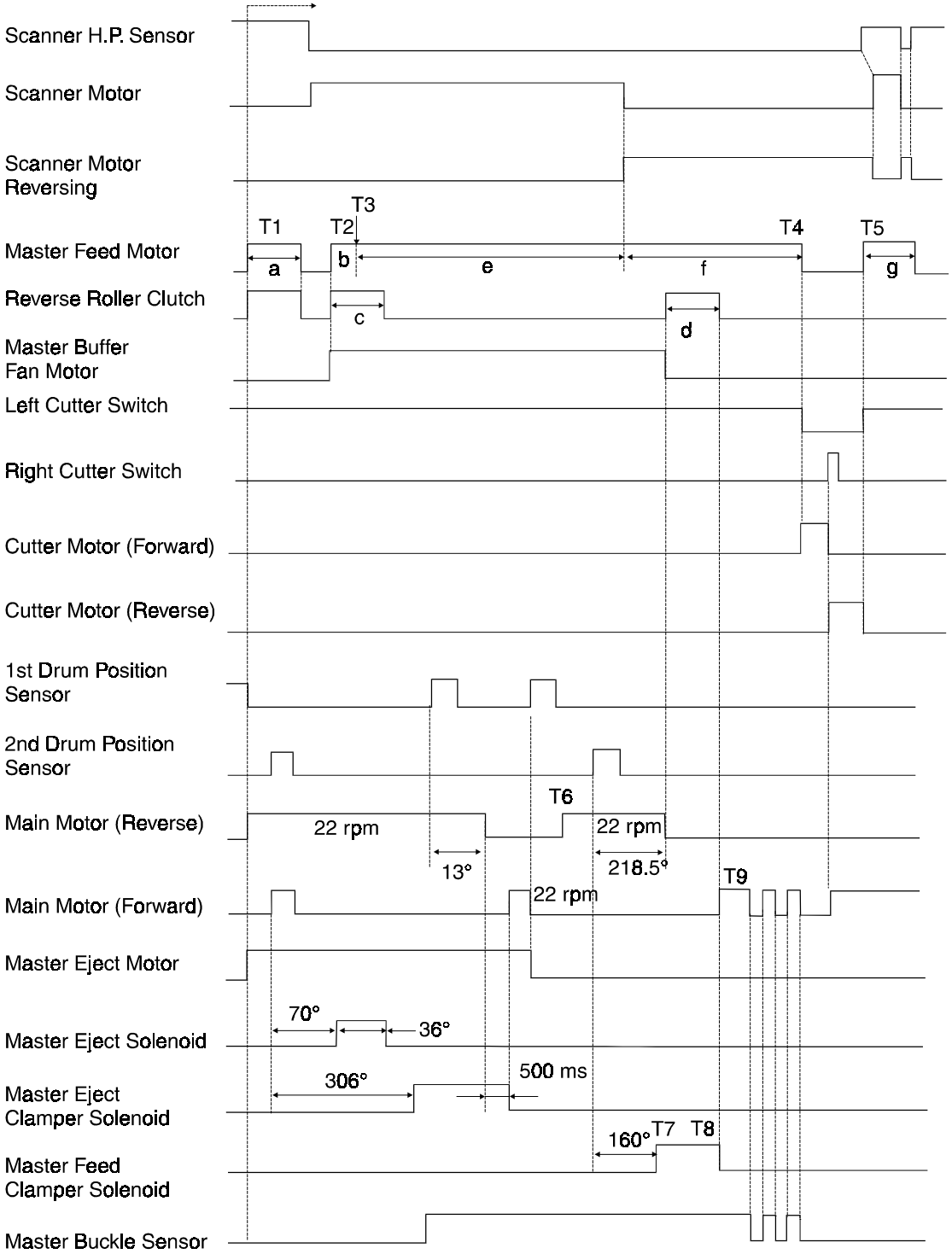
The cutter motor [A] starts turning in reverse (see the arrows) when the cutter holder [B] pushes the left cutter switch at the front (operation side) end of the cutter rail; this is the cutter holder home position. This drives the cutter holder [B] toward the rear (non-operation side) by means of the gear/pulley [C] and the wire [D] on which the cutter holder [B] is fixed.

When the cutter holder reaches the rear end of the cutter rail and pushes the right cutter switch, the cutter motor [A] changes its rotation direction, and the cutter holder [B] starts moving toward the front. The cutter motor [A] stops turning when the cutter holder [B] is back at its home position and pushes the left cutter switch. The master cutting process is now finished.

While the cutter holder [B] is traveling to the rear, the roller [E] in the cutter holder is turning clockwise because it touches the cutter rail. The roller [E] rotates the cutter blade [F] as indicated by the arrow. The master is between the blade and blade plate [G] and as the cutter moves, it cuts the master. The blade plate also serves as a lower guide plate for the master.

After the master cutting process is finished, the master is fed another 40 millimeters and the master feed process is finished.

3.6 ELECTRICAL TIMING



C223D609.wmf

Master Feed Lengths

a: 18.7 mm
b: 0.7 mm
c: 10.7 mm
d: 13.7 mm
e: 420 mm
f: 60 mm (211 mm: A4/LT drum)
g: 40 mm (61 mm: A4/LT drum)

– Master Feed –

T1: When the master making key is pressed, the main motor starts reverse rotation at 22 rpm. At the same time, the master feed motor and the reverse roller clutch turn on to feed the master 18.7 mm. Then they switch off, and the scanner motor turns on shortly afterwards.

T2: When the scanner motor has moved 20 mm from the home position, the master feed motor, master buffer fan motor, and the reverse roller clutch turn on.

T3: The thermal head starts when the master has been transported 1 mm.

T4: When the master has been transported 499.4 mm, the master feed motor stops. At the same time, the cutter motor starts rotating to cut the master. When the right cutter switch is actuated, the cutter motor starts reversing. When the left cutter switch is actuated, the cutter motor stops.

T5: When the left cutter switch is actuated, the master feed motor starts again to feed the master 40 mm.

– Master Wrapping –

T6: After the master eject operation is finished, the main motor rotates in reverse at 22 rpm. The main motor stops when the drum has rotated 220 degrees.

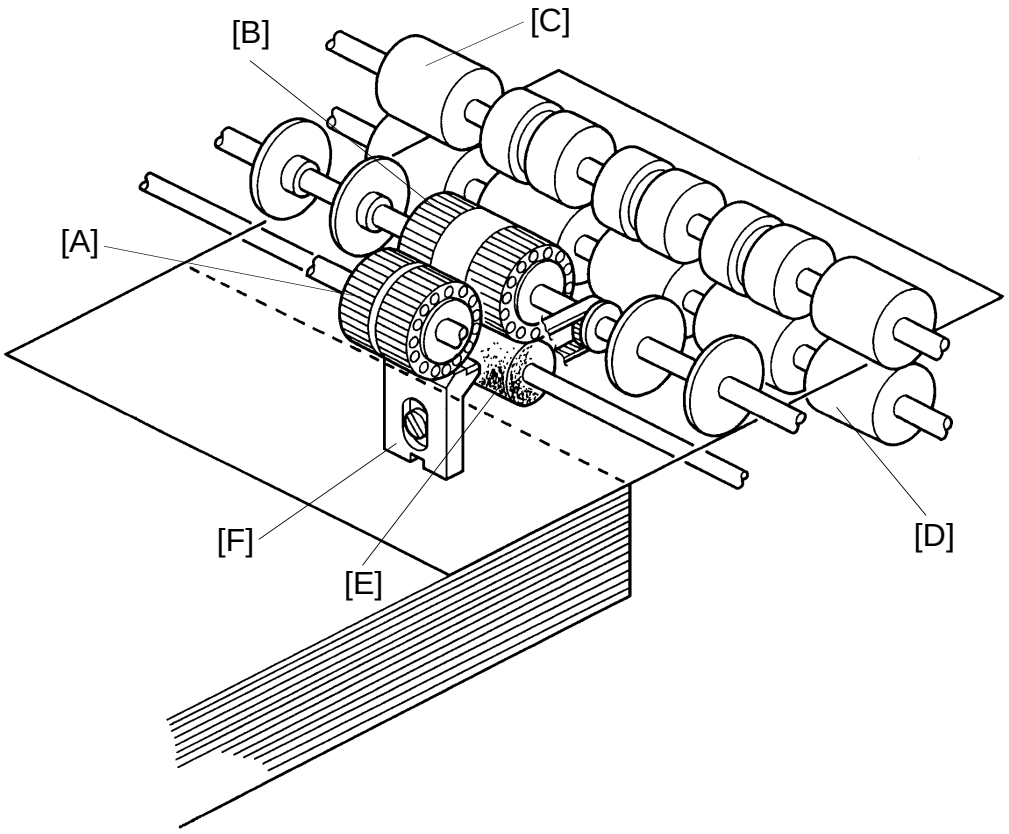
T7: When the drum has rotated 160 degrees past the 2nd drum position sensor, the master feed clamper solenoid turns on.

T8: When the drum stops at the master feed position, the master buffer fan motor turns off. At the same time the reverse roller clutch is de-energized. When the master has been transported 13.7 mm, the reverse roller clutch and the master feed clamper solenoid turn off.

T9: When the master has been clamped, the main motor starts rotating to wrap the master around the drum. The motor rotates at 22 rpm only when the master buckle sensor is activated.

4. PAPER FEED

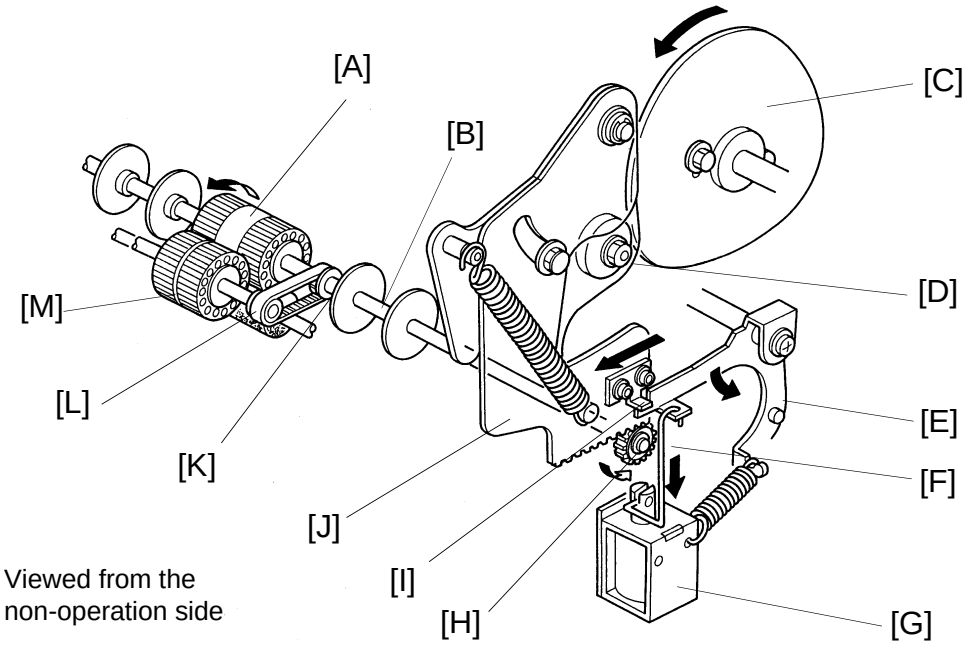
4.1 OVERALL



C223D602.img

This mechanism uses a center separation system, which consists of the separation plate [F], upper separation roller [B], and lower separation roller [E]. Because of the separation system, if a few sheets of paper are picked up from the paper stack (on the paper table) by the paper feed roller [A], only one sheet of paper is transported to the second upper feed roller [C] and second lower feed roller [D].

4.2 PAPER FEED ROLLER/UPPER SEPARATION ROLLER MECHANISM



C223D603.img

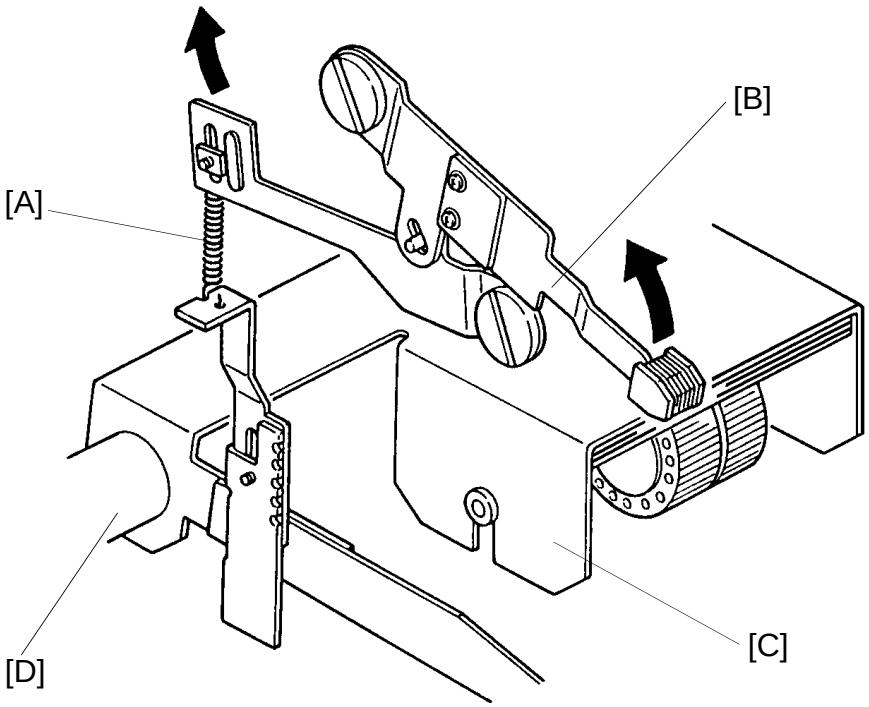
The main motor drives the paper feed roller cam [C], which moves the sector gear back and forth. The sector gear [J] rotates the paper feed roller [M] and the upper separation roller [A]. A one-way clutch inside gear [H] prevents the rollers from rotating in reverse during the return half of the sector gear movement cycle. The cam rotates once per sheet of paper.

When the paper feed solenoid [G] turns on, it pulls the link [F] away from the sector gear to allow it to rotate. When the cam roller [D] is at the widest part of the paper feed roller cam [C], the sector stopper [E] drops away in a counterclockwise direction as a clearance is formed between the stopper and pin [I]. Then, the cam roller [D] on the sector gear is able to move along the surface of the cam [C]. The solenoid [G] stays on during the copy cycle.

When the narrowest part of the paper feed roller cam [C] is rotating away from the cam roller [D] and the widest part is approaching, the sector gear [J] turns clockwise and the gear [H] is turned counterclockwise. The rotation of the gear [H] is transmitted to the upper separation roller shaft [B], and the upper separation roller [A] turns counterclockwise. At the same time, the pulley [K] on the upper separation roller shaft [B] turns, and the belt [L] rotates the paper feed roller [M] counterclockwise to feed the printing paper.

When the narrowest part of the paper feed roller cam [C] approaches the cam roller [D] again, the sector gear [J] turns counterclockwise and the gear [H] is turned clockwise. However, a one-way clutch inside the gear [H] prevents the upper separation [A] and paper feed rollers [M] from turning.

4.3 FEED ROLLER PRESSURE MECHANISM



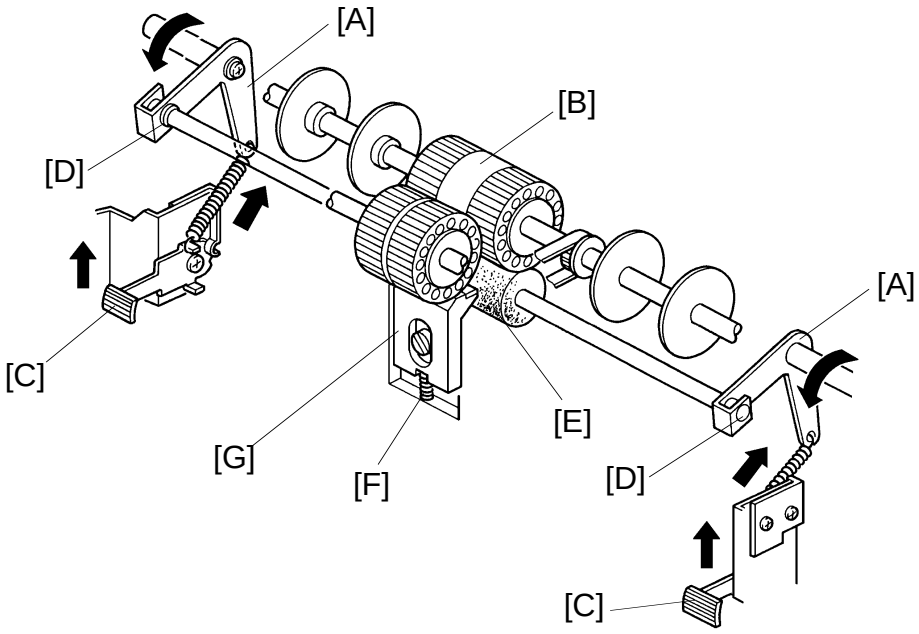
C223D606.img

Due to the weight of the feed roller assembly [C], the paper feed roller presses the paper stacked on the paper table. This is because the feed roller assembly rotates freely around its shaft [D].

The spring [A] applies tension to the feed roller assembly in the direction in which the paper feed roller is pulled up. When the feed pressure lever [B] is moved up, the spring [A] is stretched. Thus, the tension of the spring is increased, weakening the feed roller pressure.

Originally, the feed pressure lever is in the up position. When thick paper (132.5 to 215 g/m^2, or 35.2 to 57 lb) is used and frequently paper is not fed, push down the feed pressure lever. The feed roller pressure will increase.

4.4 PAPER SEPARATION MECHANISM



C223D604.img

Pressure from spring [F] holds the separation plate [G] against the upper separation roller. A rubber pad on top of the separation plate allows only a few sheets of paper to reach the lower separation roller. If too many sheets of paper are fed to the lower separation roller at the same time, the lower separation roller may not be able to separate the sheets; it can separate only two or three sheets of paper.

Springs pull lever [A] and this pushes up the lower separation roller [E]. Then this roller presses the sheets to be fed against the upper separation roller [B]. Also, the lower separation roller does not turn in the paper feeding direction. (It turns in the opposite direction due to the one-way clutch bearings [D] provided on both right and left separation levers [A].) When two or more sheets of paper are fed, a brake force is applied to the lower sheets of paper due to the friction between the paper and the lower separation roller. Then, the sheets are separated and one sheet of paper is fed to the second feed rollers.

The pressure between the upper and lower separation rollers can be adjusted by changing the right and left separation pressure adjusting levers [C] as follows (this is a user-level adjustment):

Levers Up:	Separation pressure decreases.
Levers Down:	Standard position.

When dog-eared or wrinkled prints are delivered, the separation pressure should be decreased.

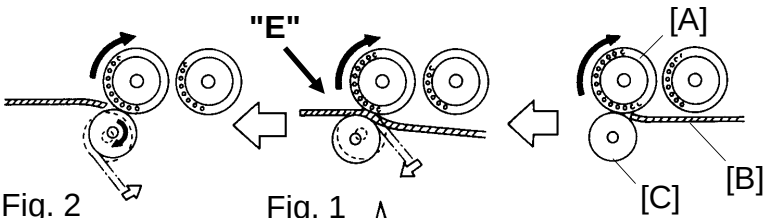
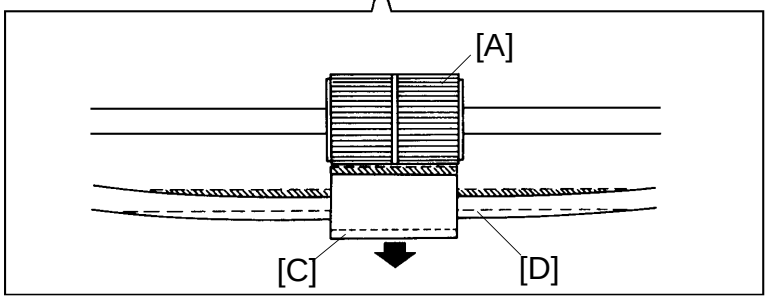
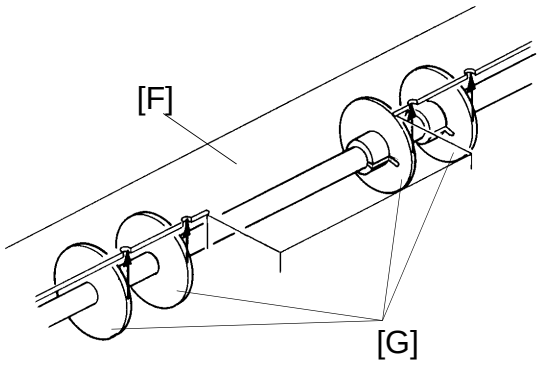


Fig. 2 Fig. 1



View from **"E"**

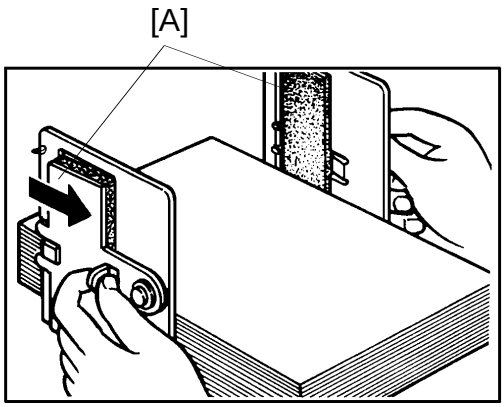
C223D523.img



C223D524.img

The lower separation roller [C] turns slightly (see the arrow in Fig. 2) due to the one-way clutch bearings when paper passes through the roller. The lower separation roller [C] and its shaft [D] are pushed down slightly by the paper [B] when the upper separation roller [A] is feeding the paper (Fig.1). Just when the paper is fed out from the rollers, the lower separation roller [C] and its shaft [D] spring back against roller [A] (Fig. 2). This rotates the lower separation roller and ensures that it will wear evenly.

Four paper guide rollers [G] are there to reduce curl in the paper's leading edge, and to feed the paper smoothly to the guide plates. There are four marks on the bracket [F] corresponding to the roller positions as shown in the lower diagram.



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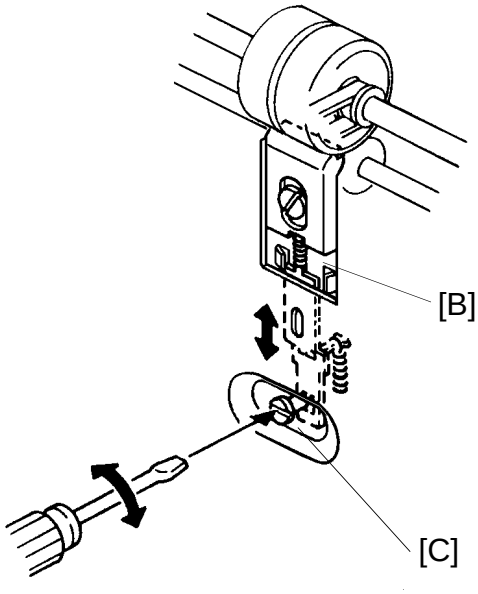


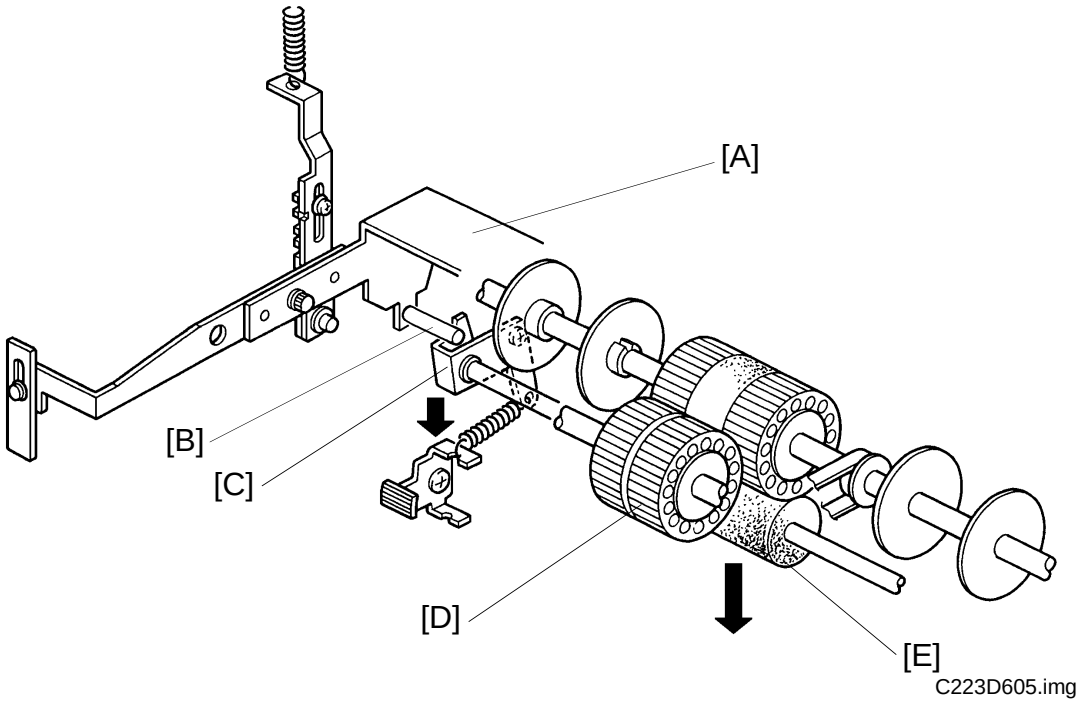
C223D530.img

The side pads [A] in the front and rear paper side guides prevent multiple feed. These are especially useful when thin paper is used. After adjusting the paper side plates to the proper paper width (so that they touch the paper lightly), move the front and rear side pad levers to the right (as viewed from the operation side of the machine). Normally, the pressure from the side pads should be released by moving the levers to the left.

The separation plate pressure can be adjusted to match the type of paper being used. The plate which supports the pressure plate spring [B] can be moved up or down by turning the eccentric cam shaft [C] (this is a service-level adjustment only).

If multiple paper feed frequently occurs, the plate should be moved up.
If paper misfeeds frequently, the plate should be moved down.

4.5 SEPARATION ROLLER PRESSURE RELEASE MECHANISM

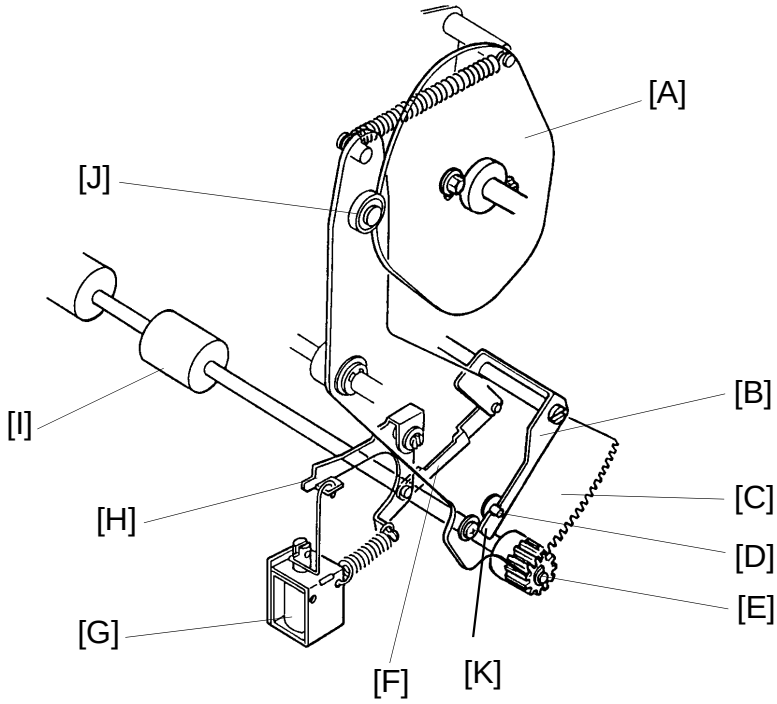


When printing is finished or a misfeed occurs, the paper table drive motor rotates for 500 milliseconds to lower the paper table. The paper on the paper table moves down from the paper feed roller [D] and the paper feed bracket [A] is pulled down by its own weight.

At this time, the shaft [B] pushes down the left separation lever [C] and this moves the lower separation roller [E] slightly downward.

This mechanism makes it easier to remove paper caught between the upper and lower separation rollers.

4.6 SECOND FEED ROLLER MECHANISM



C223D531.img

Drive Mechanism

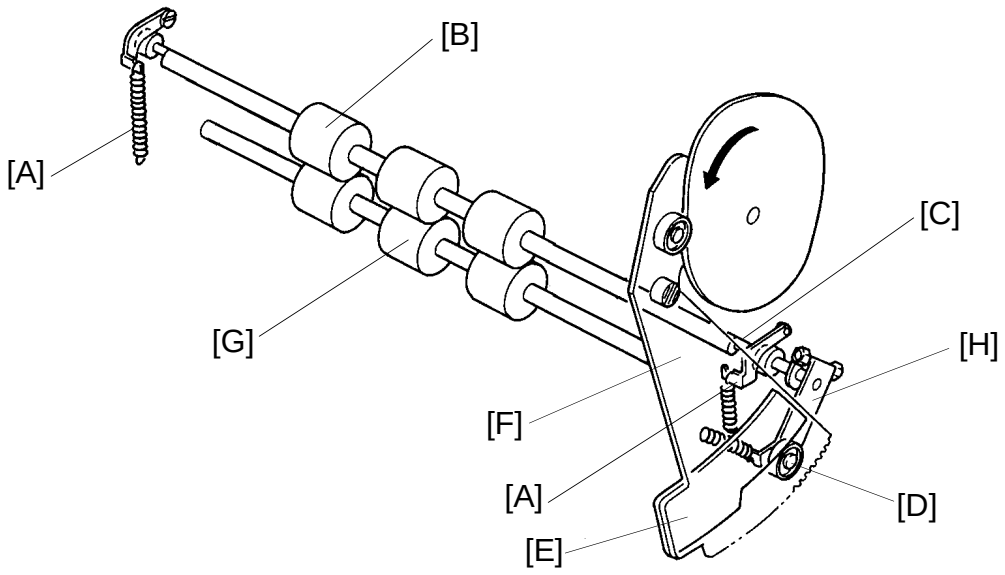
The main motor drives the lower second feed roller cam [A], which moves the sector gear [C] back and forth. The sector gear [C] rotates the lower second feed roller [I]. A one-way clutch inside the feed roller gear [E] prevents the roller from rotating in reverse during the return half of the sector gear movement cycle. The cam rotates once per sheet of paper.

When the paper feed solenoid [G] turns on, it pulls link [F], the 1st paper feed roller sector gear stopper [H], and the 2nd feed roller sector gear stopper [K].

The bearing [J] on the sector gear moves along the cam surface. When the widest part of the cam comes to the bearing [J], the stopper [B] is released from the sector gear as a clearance is formed between the pin of the sector gear [D] and the stopper [K].

When the feed roller gear turns counterclockwise, its rotation is not transmitted to the lower second feed roller due to the one-way clutch bearing in the gear.

When the narrowest part of the second feed roller cam moves away from the bearing [J], the sector gear turns counterclockwise and the feed roller gear turns clockwise. As the rotation of the feed roller gear is transmitted to the lower second feed roller, the lower second feed roller turns clockwise to feed the paper to the drum.



C223D542.img

Release Mechanism

This mechanism releases the upper second feed rollers [B] from the lower one [G] after the press roller and the drum catch the paper leading edge.

The mechanism is made up of several parts. First, a cam which transmits motion to a sector gear [F]; then another cam [E] that is part of the sector gear. This cam pushes a bearing [D], which causes the lever [H] attached to this bearing to turn the upper feed roller shaft [C] so that the upper rollers contact the lower rollers.

At the beginning of each cycle the upper and lower rollers are away from each other. They come together halfway through the cycle and at the end of the cycle they separate again.

At first, the rollers are separate, and the sector gear [F] is ready to start moving clockwise. The bearing [D] on the lever [H] is in contact with the cam [E] on the sector gear. As the gear turns clockwise, it causes the cam to turn the lever in the same direction (clockwise).

The lever then lowers the upper roller [B]. It does this by turning the roller's eccentric shaft [C]. The shaft is a little off center, so when the shaft turns the roller, the roller moves up or down.

When the cycle is halfway through, the sector gear has reached its maximum clockwise position. Now the upper roller touches the lower one and a pair of springs [A] apply tension at each end of the upper roller. Until now the lower roller has not turned.

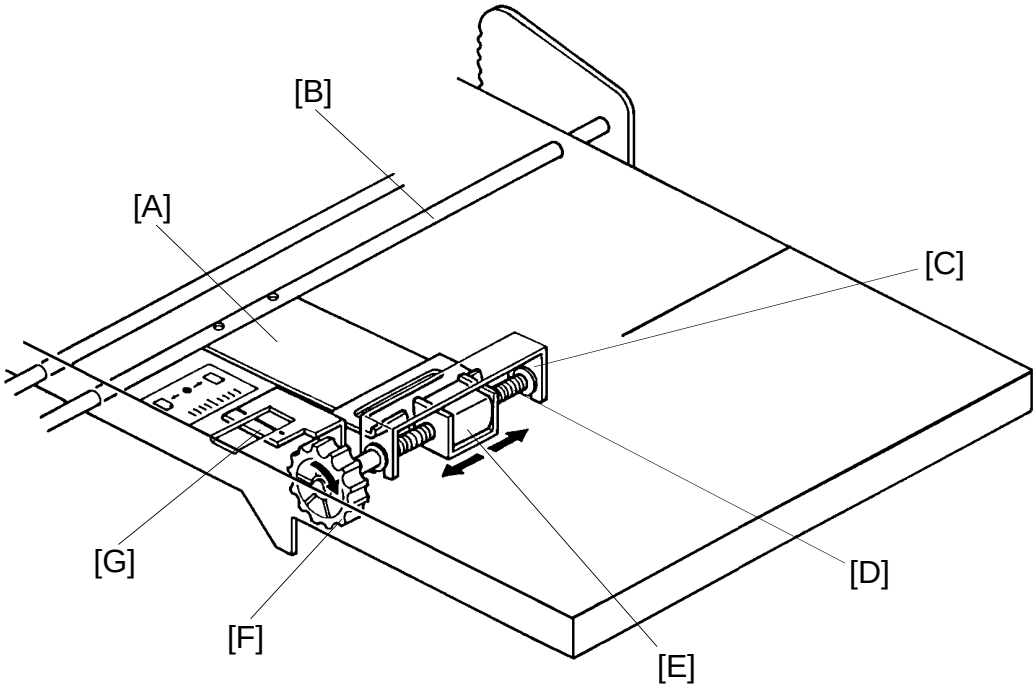
At this point, the paper arrives from the first paper feed rollers. The leading edge hits the two rollers and the paper buckles slightly. This ensures that the paper will go into the rollers straight.

The lower roller now begins turning and feeds the paper to the drum section. The sector gear is now turning counterclockwise, raising the upper roller. The gear returns to its original position and the cycle is now over.

Service Note

The paper buckles slightly as the leading edge of the paper arrives from the first paper feed rollers before the second paper feed rollers start to turn. The second feed roller start timing can be adjusted to change the leading edge margin. See "Removal and Adjustment: Second Feed Roller Start Timing".

4.7 PAPER TABLE SIDE ADJUSTMENT MECHANISM



C223D532.img

The shaft [D] of the fine adjustment dial [F] is threaded. The inside of the sleeve [E] is also threaded. The sleeve is fixed to the paper table stay [B] through a bracket [A].

The paper table bracket [C] mounted under the table is fixed to both ends of the adjustment dial shaft. When the adjustment dial is turned clockwise, the feed table bracket [C] and the paper table move to the right.

The indicator [G] fixed to the bracket [A] shows how much the paper table has moved.

4.8 PAPER TABLE UP/DOWN MECHANISM

There are diagrams of this mechanism on the following page.

The paper table is raised and lowered by the paper table drive motor.

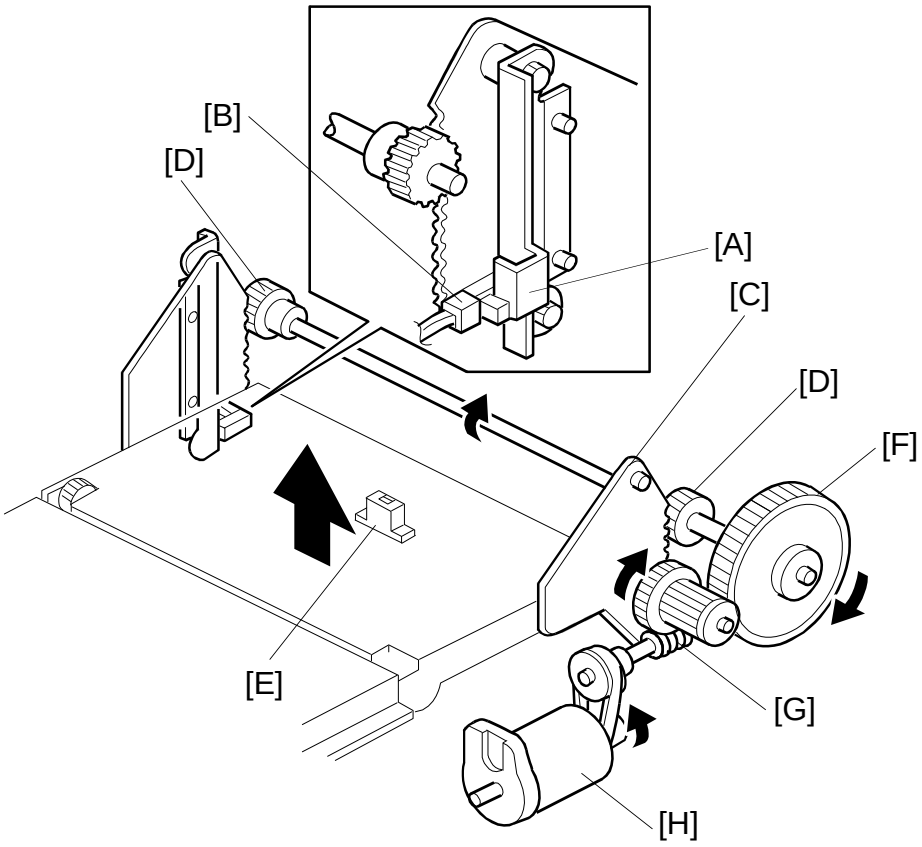
The paper end sensor [E] (a reflective photosensor) is actuated when the paper is placed on the paper table. When the Print Start key is pressed, the paper table drive motor [H] starts turning clockwise and the worm gear [G] also turns. The gear [F] turns clockwise and both gears [D] turn to raise the racks [C].

As the paper table rises, the paper pushes against the paper feed roller [I]. This raises the lever [J] which is mounted on the paper feed bracket. This activates the paper table height sensor [K] (the phototransistor detects the light from the photocoupler, which up to now was cut off by the lever), and that causes the paper table motor [H] to turn off and stop raising the paper table.

As printing proceeds and the paper level runs down, the lever [J] cuts off the light path in the photocoupler and the motor [H] turns clockwise until the phototransistor is reactivated. As a result, the top of the paper stack is constantly kept at the correct height.

When no paper is present, the paper end sensor [E] is not activated and the motor [H] turns counterclockwise to lower the paper table. The paper table is lowered until the actuator [A] (fixed to the front rack) interrupts the lower limit sensor [B].

When a misfeed occurs or printing is finished, the paper table motor [H] turns counterclockwise for 500 milliseconds, slightly lowering the paper table.



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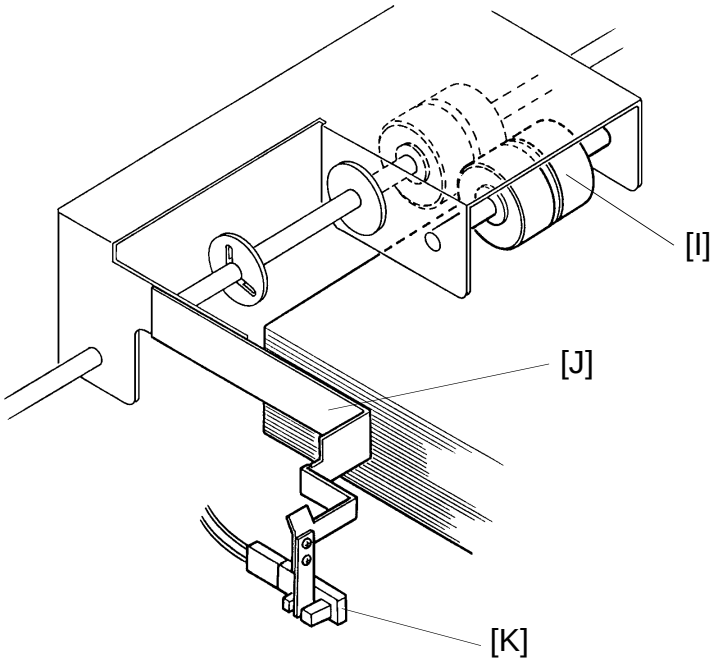


C223D534.img

4.9 PAPER SIZE DETECTION

The machine determines the printing area of the master based on the detected paper size and the original length (which is detected during the original scanning process). If the original size is different from the paper size, the machine compares the lengths of the original and the paper. The master's length will be the shorter of the two. The printing width of the master is determined by the paper width.

Note: The determined master printing area is not changed if the paper on the paper table is replaced with another size of paper during the master making process.

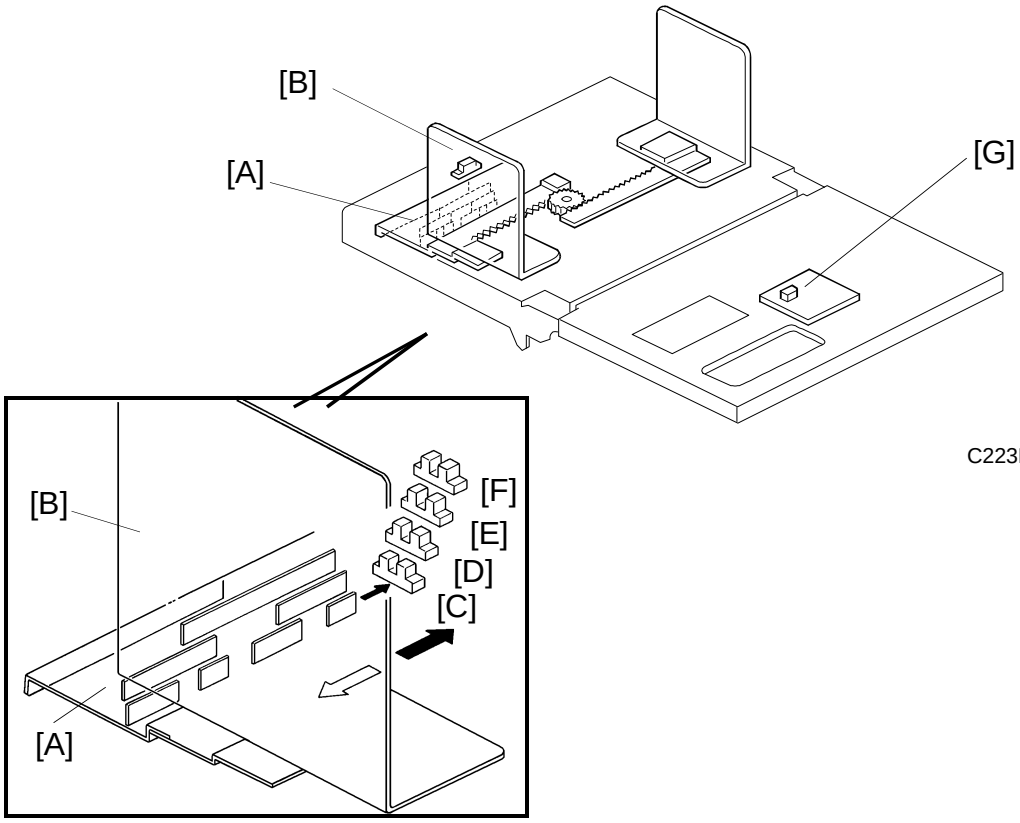
The printing area of the master for each detected paper size is as follows:

Paper Size	Printing Area of the Master	
	Width (mm)	Length (mm)
A3	292	412
B4	256	356
A4	208	289
A4-S	292	202
B5	180	249
B5-S	256	174
A5	146	202
DLT	278	412
LG	214	348
LT	214	271
LT-S	278	208
HLT	138	208

S: Sideways feed

The machine can only distinguish standard sizes. If a non-standard paper size or original size is used, the machine will determine a standard size for the non-standard sized paper or original. If the actual paper size, the non-standard sized paper, or the original is larger than the determined paper size, the excess area will not be transferred to the master. In such a case, paper size detection can be canceled using SP mode (no. 142-1) in order to obtain the entire image of the original. However, the press roller may become contaminated with ink if the paper is smaller than the image on the master. The ink will be transferred to the back side of the prints when the next printing is done with larger paper.

Paper Size Detection for the Paper Table



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C223D536.img

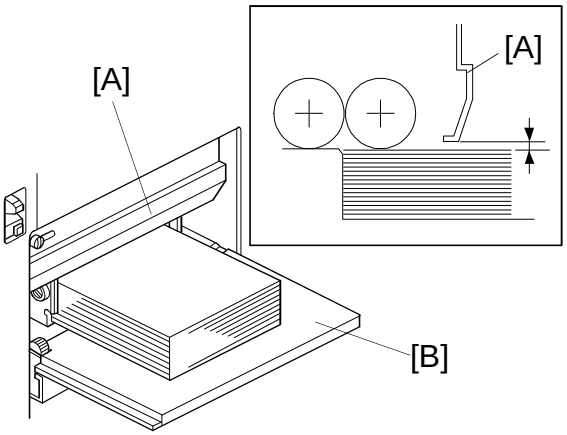
The paper width detection plate [A] behind the front paper side guide [B] has several interrupters.

The front and rear paper side guides are adjusted to the paper width. Depending on which paper width sensors ([C] [D] [E] [F]; 4 photointerrupters) are interrupted and whether the paper length sensor [G] (a reflective photosensor) is activated, the machine determines the paper size as shown in the table below.

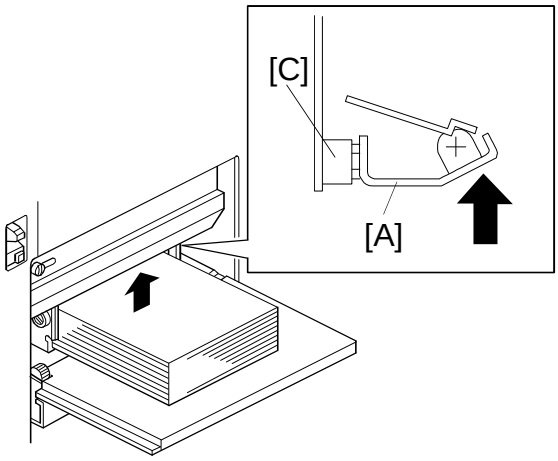
Paper Size	A4-S	LT-S	B5-S	LT	A4		B5	A5	HLT		A3	DLT	B4	LG
Paper Width Sensor-0 [C]	o	x	o	x	x	x	o	x	x	o	o	x	o	x
Paper Width Sensor-1 [D]	x	o	o	x	x	x	o	o	o	o	x	o	o	x
Paper Width Sensor-2 [E]	x	x	o	o	o	o	o	x	x	x	x	x	o	o
Paper Width Sensor-3 [F]	x	x	x	x	x	o	o	o	o	o	x	x	x	x
Paper Length Sensor [G]	x	x	x	x	x	x	x	x	x	x	o	o	o	o

x: Not blocked or Not activated, o: Blocked or Activated
S: Sideways feed

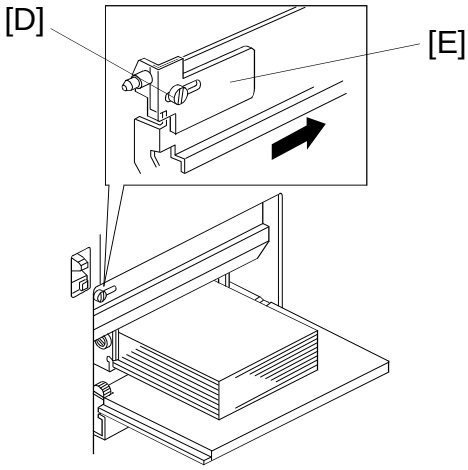
4.10 NOISE REDUCTION COVER



C223D621.wmf



C223D622.wmf



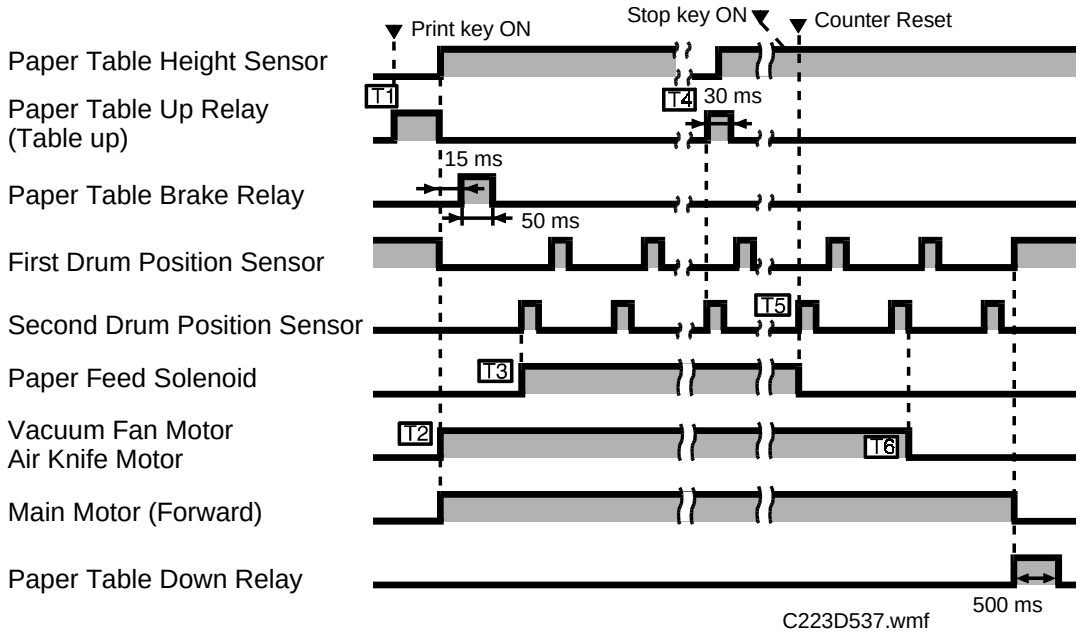
C223D623.wmf

The noise reduction cover [A] reduces the paper feed noise. When the paper feed table [B] is in the paper feed position, there is a small clearance between the paper stack and the noise reduction cover.

The noise reduction cover can be folded back when a user puts paper on the table. The magnet [C] catches the cover to keep it in the upper position.

By loosening the screw [D], the bracket [E] can be slid in the arrow direction and the noise reduction cover can be removed from the machine.

4.11 ELECTRICAL TIMING



T1: When paper is placed on the paper table and the Print key is pressed, the paper table moves up until the paper table height sensor is activated. 15 milliseconds after the height sensor is activated, the paper table brake signal turns on for 50 milliseconds to apply braking force to the paper table drive motor to prevent the paper table from overrunning.

T2: When the height sensor is activated, the vacuum fan motor and air knife motor turn on. At the same time, the drum (main motor) starts turning forward (this is the printing direction).

T3: The paper feed solenoid is energized when the interrupter at the rear side of the drum activates the second drum position sensor.

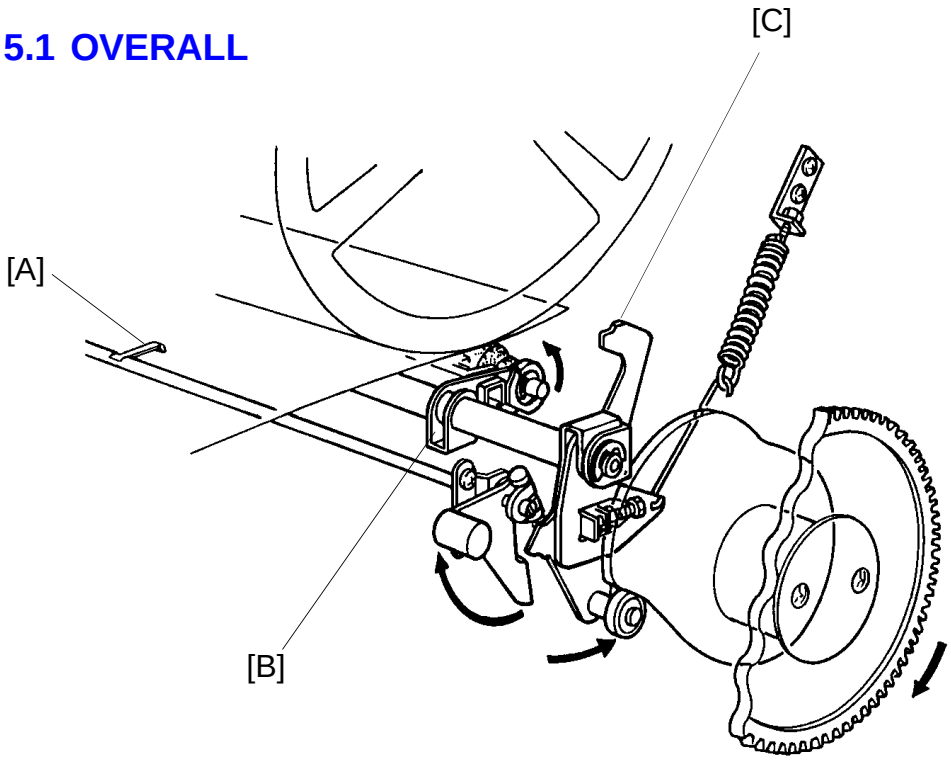
T4: After the paper is fed, the top of the paper stack is a little lower and the height sensor is de-activated. When the second drum position sensor is activated, the paper table drive motor starts rotating. This lifts the paper table until the height sensor is re-activated (approximately 30 milliseconds after the motor starts). When the height sensor is re-activated, the motor stops rotating.

T5: After the Stop key is pressed, the paper feed solenoid is de-energized the next time that the second drum position sensor is activated. The counter on the operation panel will be reset at this time.

T6: When the second drum position sensor is again activated after one more drum rotation, the vacuum fan motor and air knife motor turn off. Then, the drum rotates once more and stops at the first drum position actuation position (the drum home position).

5. PRINTING

5.1 OVERALL



C223D538-1.img

In standby mode, the printing pressure roller is held away from the drum by two devices, a solenoid (the printing pressure solenoid), and a mechanical arm (activated by the paper detection feeler [A]).

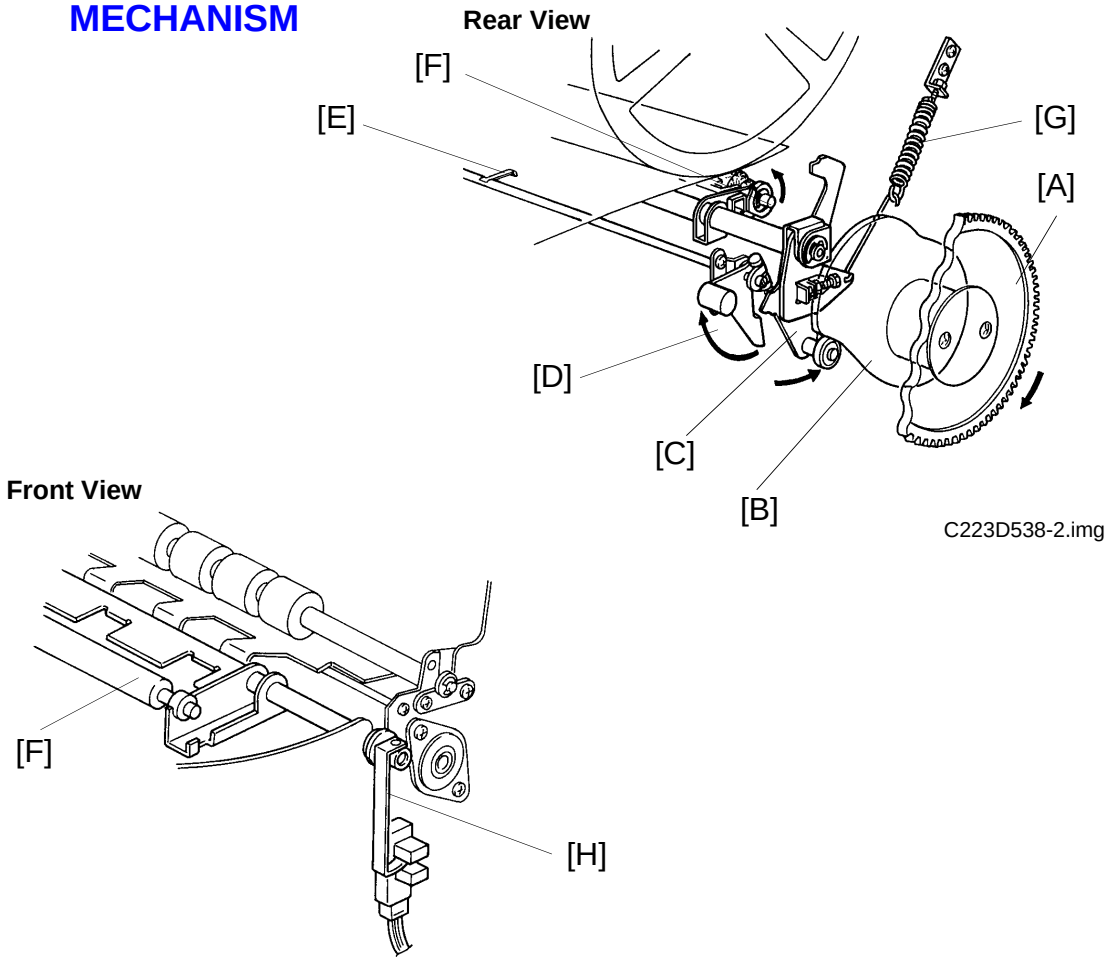
At the start of printing, the printing pressure solenoid releases its hold on the printing mechanism at point [C], and the paper feed solenoid turns on to transfer drive from the main motor to the paper feed mechanism.

Soon after the paper has reached the second paper feed roller, the paper detection feeler [A] is pushed down by the paper, which completely releases the printing mechanism.

Printing pressure is then applied (the press roller [B] touches the drum) to transfer the ink from the master to the printer paper.

If the machine is not used for more than 8 hours, a drum stroke operation is done before the master wrapped around the drum is removed. This operation minimizes the wasted prints before the image is stabilized.

5.2 PAPER DETECTION AND PRINTING PRESSURE ON/OFF MECHANISM



C223D538-2.img

C223D540.img

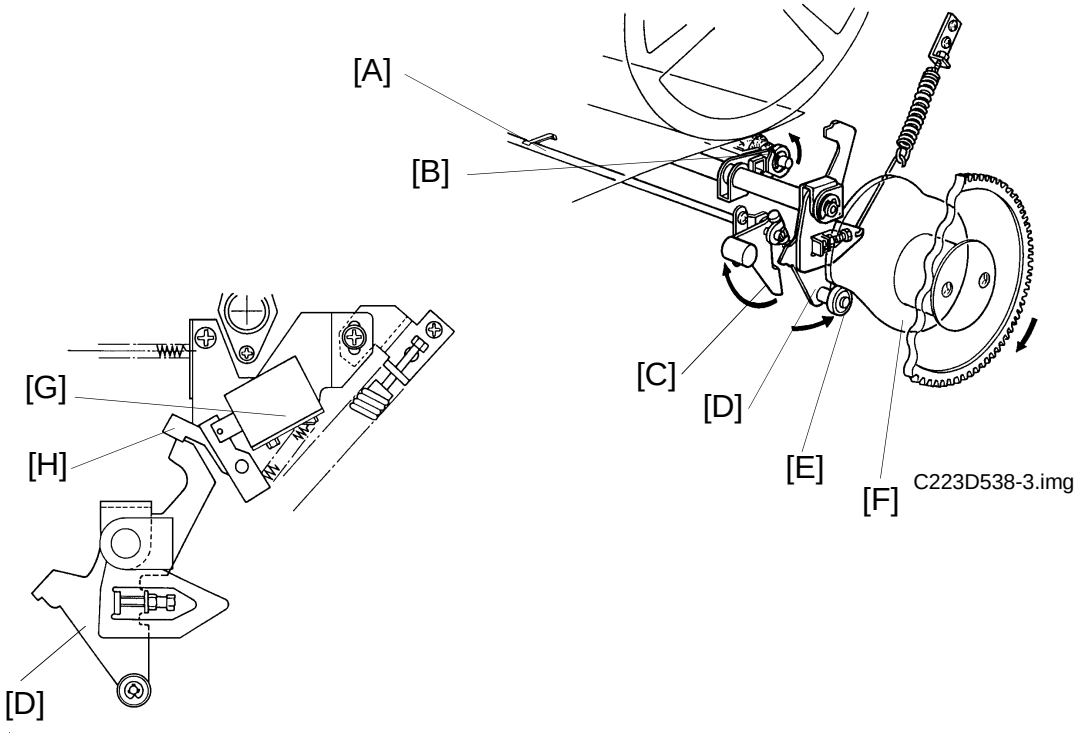
During the printing process, the main motor turns the gear [A] and pressure cam [B] clockwise.

When the widest part of the pressure cam [B] reaches the bearing on the pressure on/off lever [C], the paper detection arm [D] separates from the pressure on/off lever [C]. At this moment, if paper is being fed, the paper presses down the paper detection feeler [E]. Then, the paper detection arm [D] turns clockwise to release the pressure on/off lever. As a result, the pressure on/off bearing continues moving along the pressure cam and the press roller [F] moves against the drum to apply printing pressure.

The printing pressure can be adjusted with the pressure spring [G].

The printing pressure sensor feeler [H] is away from the sensor while printing pressure is applied.

5.3 PRINTING PRESSURE RELEASE MECHANISM



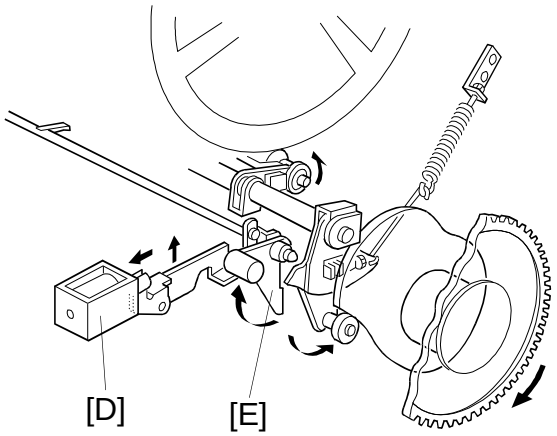
C223D539.img

During normal operation, the printing pressure solenoid [G] energizes to release the pressure on/off lever [D] at the same time as the paper feed solenoid energizes.

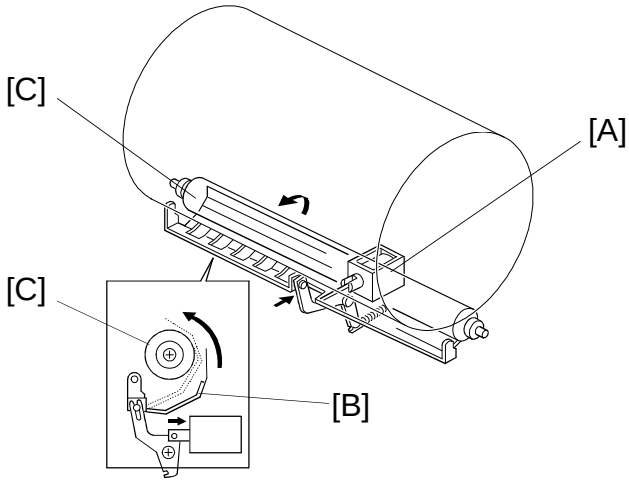
If a jammed sheet of paper in the printing section presses down on the paper detection feeler [A], the pressure on/off lever [D] remains disengaged from the paper detection arm [C]. Printing pressure will keep on being applied to the drum. If this printing pressure is still applied when an operator slides out the drum unit to remove the jammed sheet, the drum surface and the press roller could be damaged.

To prevent this, printing pressure is released from the drum if a paper misfeed is detected. When a misfeed is detected, the printing pressure solenoid [G] is de-energized. Then, the drum rotates to the home position. While the drum returns to the home position, the widest part of the pressure cam [F] approach the bearing [E]. This moves the pressure on/off lever [D] clockwise, then the stopper [H] engages the lever [D] (because the stopper [H] is pressed down by spring tension from the solenoid). Thus, printing pressure is released since the lever [D] is connected to the press roller [B].

5.4 QUALITY START OPERATION



C223D557.wmf



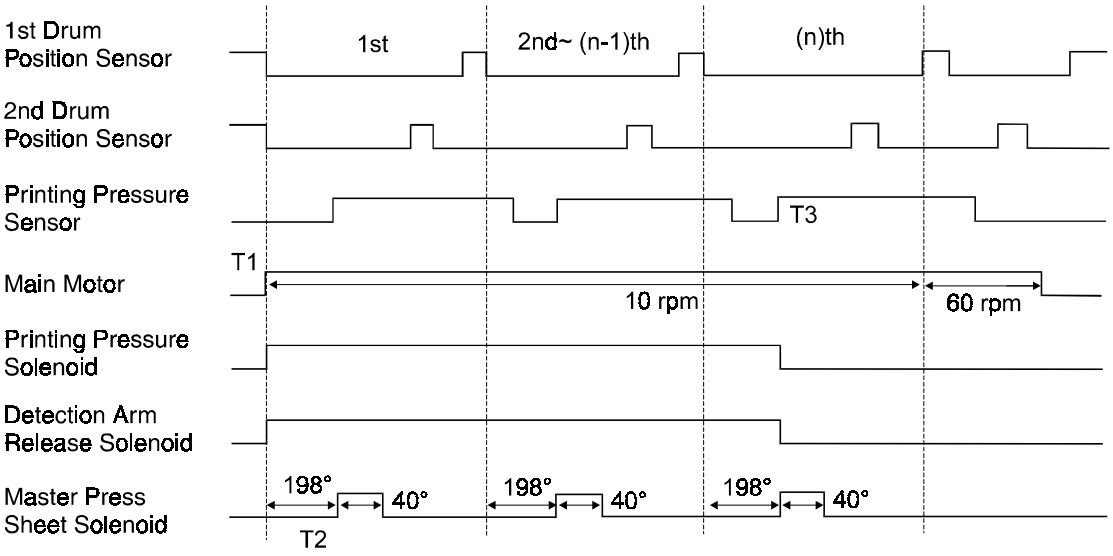
D223D558.wmf

If the main motor has been kept off for more than 6 hours, a drum stroke operation is done before the master wrapped around the drum is removed. This operation removes the dried ink with the ejected master to minimize the waste prints before the print image is stabilized.

When the master making key is pressed, the master press sheet solenoid [A] is energized. The master press sheet mylar [B] is inserted between the drum and the press roller [C]. At the same time, the detection arm release solenoid [D] is energized to release the paper detection arm [E]. Then, the main motor turns on and the press roller presses the mylar sheet to stroke the drum surface. The drum rotates twice (three times if the machine is kept off for more than 32 hours) to stroke the master around the drum. Then the master press sheet solenoid and the detection pin release solenoid are de-energized and the master eject operation starts.

There is no paper in the paper path at this time to release the paper detection arm [E] so that printing pressure can be applied to the master press sheet mylar [B], so the extra solenoid [D] was added to the mechanism.

5.5 ELECTRICAL TIMING



C223D556.wmf

T1: The main motor starts. At the same time, the printing pressure solenoid and the detection arm release solenoid turn on.

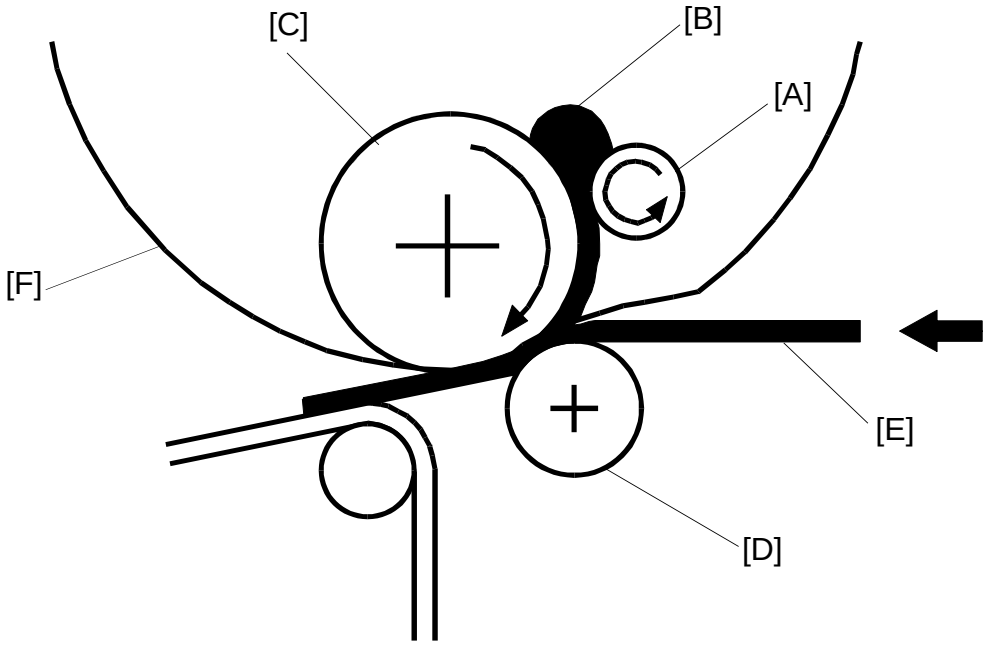
T2: When the drum has rotated 198 degrees from the home position, the master press sheet solenoid turns on. The solenoid turns off when the drum has rotated a further 40 degrees.

T3: When the printing pressure sensor turns on after the master press sheet solenoid has been energized (n-1) times, the printing pressure solenoid and the detection arm release solenoid turn off.

The value of "n" depends on SP79 and 80.

6. DRUM

6.1 OVERALL

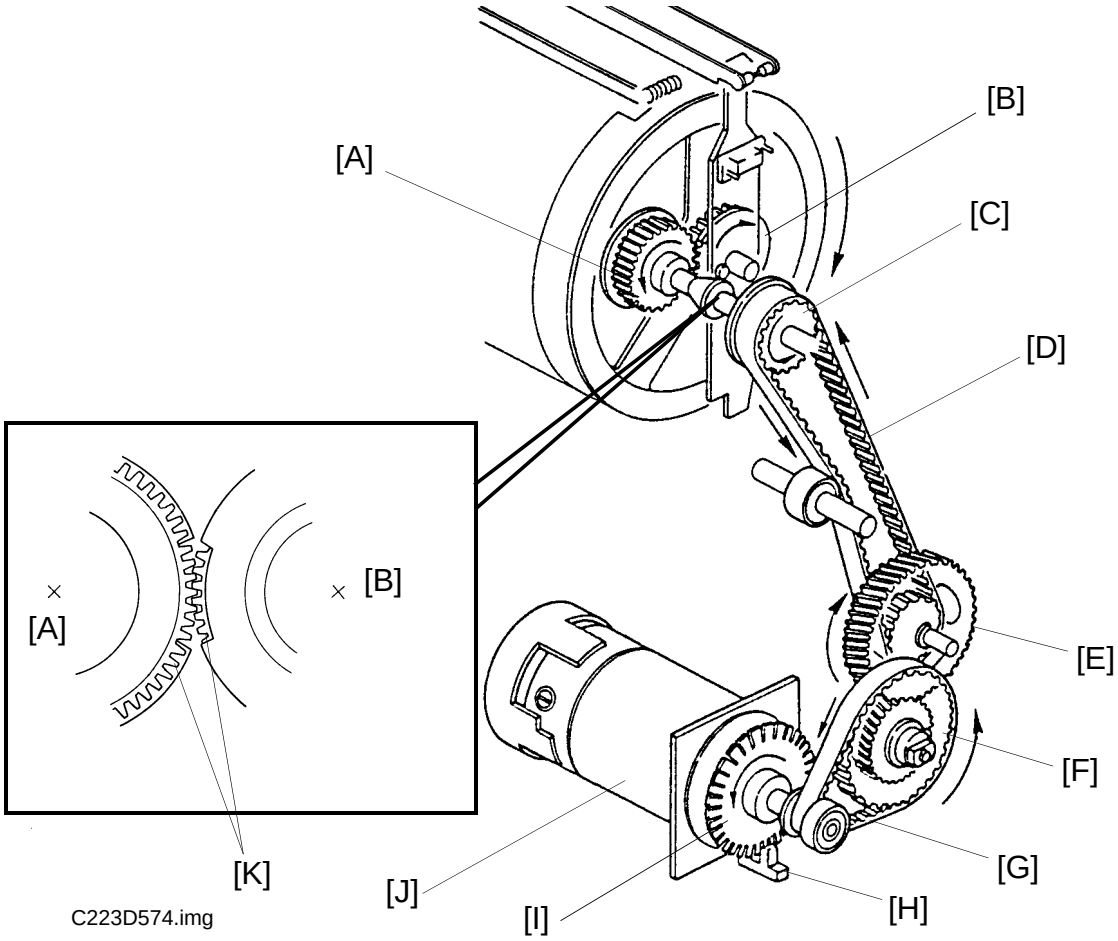


C223D541.wmf

[A]: Doctor Roller
[B]: Ink
[C]: Ink Roller
[D]: Press Roller
[E]: Paper
[F]: Drum

Ink is supplied from the ink cartridge and is applied to the ink roller uniformly. The ink is then transferred to the printing paper through the holes in the master.

6.2 DRUM ROTATION MECHANISM



C223D574.img

C223D575.img

The main motor (a dc motor) [J], located under the rear side plate, turns the drum either clockwise or counterclockwise through belt [G], then through gears [F] and [E], then belt [D], and pulley [C]. The drive mechanism uses helical gears because they turn more quietly.

Notice gear [A], the last gear of the drive, and gear [B] at the rear end of the drum: they each have a part cut out of the flange [K]. When the drum is in the home position, the cutout parts meet, and the drum unit can be pulled out.

Pulse disk [I] and sensor [H] on the main motor shaft monitor the drum rotation speed.

6.3 DRUM LOCK MECHANISM 1

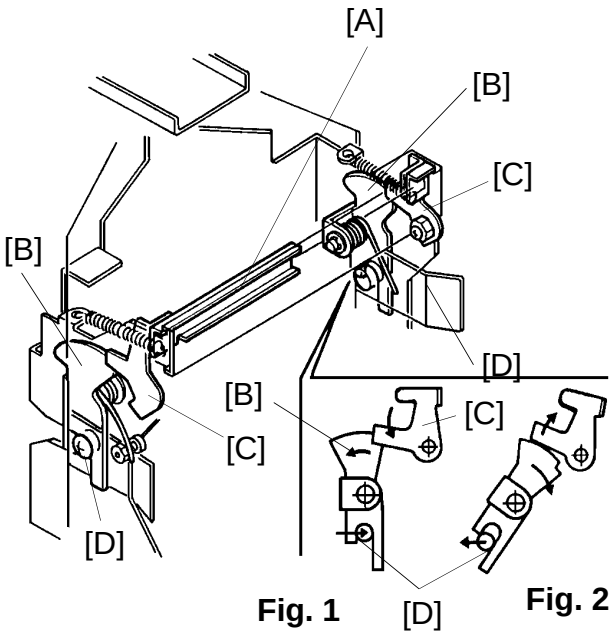


Fig. 1 Fig. 2

C223D543.img

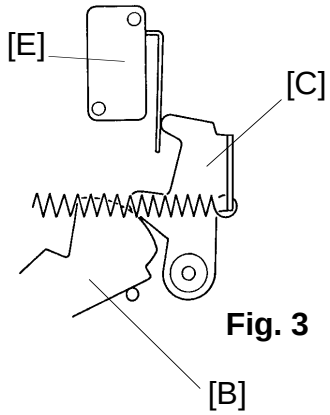


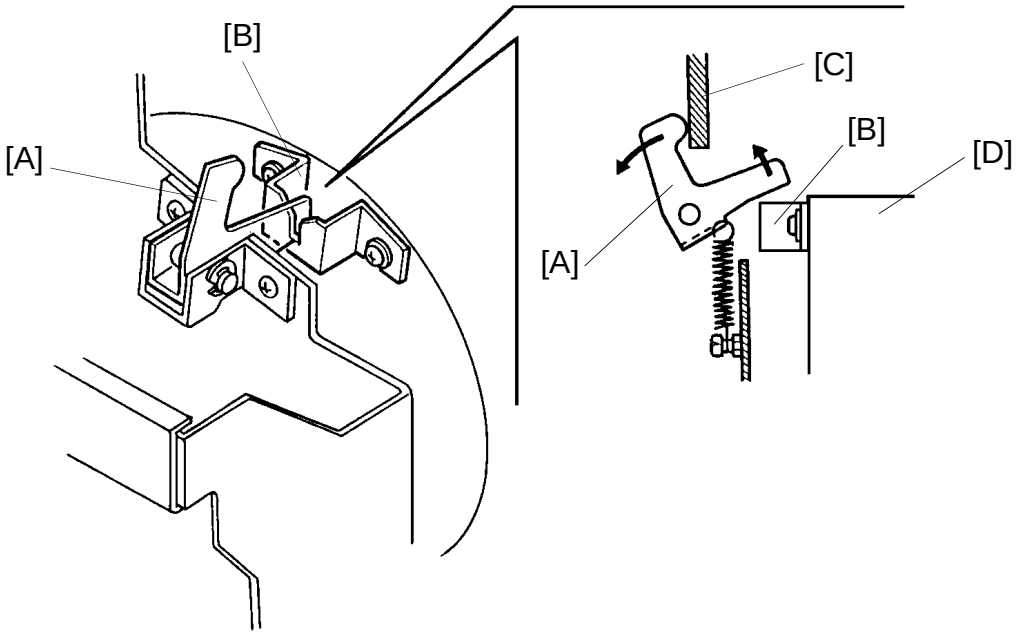
Fig. 3

C223D544.img

When the drum unit is placed in the machine, the arm [B] is pushed by the lock pin [D] until the top of the arm [B] is locked by the stopper [C]. This completely locks the drum unit in the machine (Fig. 1). At the same time, the top of the right stopper [C] turns on the drum detection switch [E]. The switch [E] tells the machine that the drum unit is in place (Fig. 3).

Pulling the lever [A] to the operation side turns the stopper [C] clockwise and disengages the arm [B]. Therefore, the lock pin [D] of the main body is also released from the arm [B] due to spring tension (Fig. 2).

6.4 DRUM LOCK MECHANISM 2

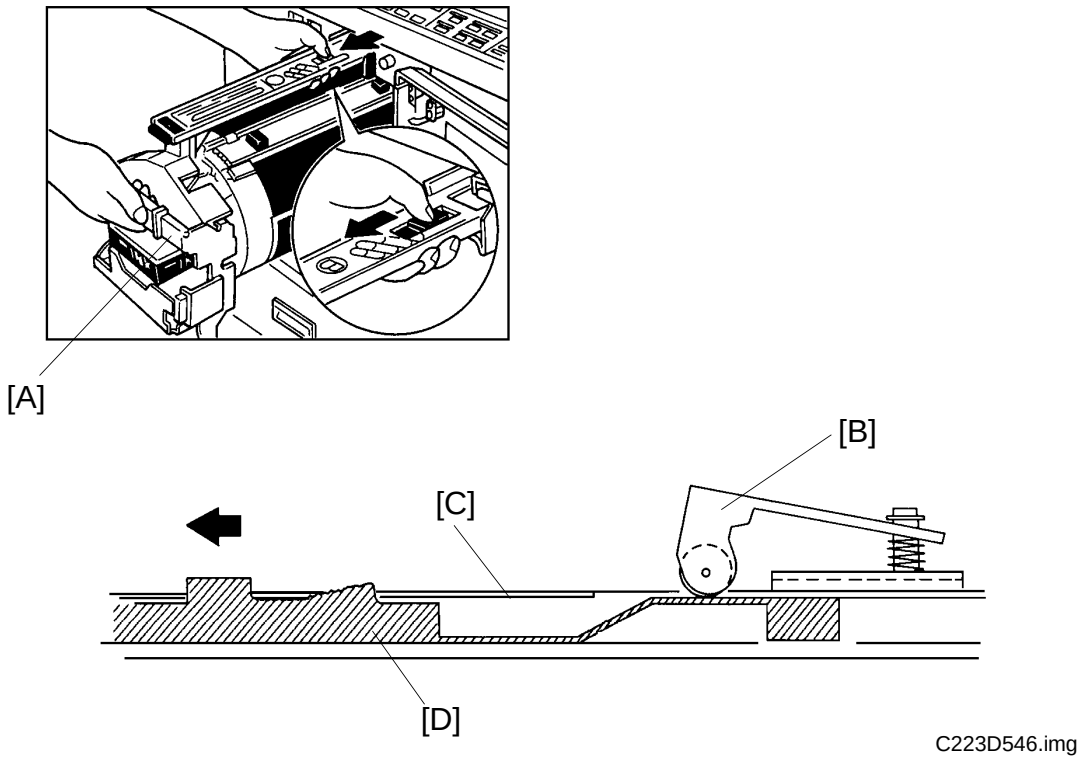


C223D545.img

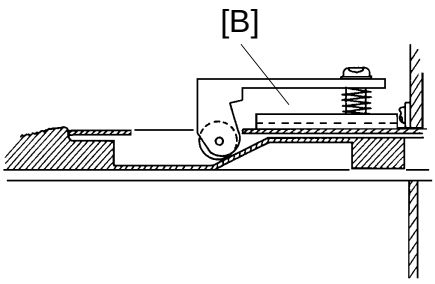
To prevent the drum from rotating when the drum unit is slid out, the drum stopper [A] drops into the drum lock [B]. This secures the drum [D].

When the drum unit is put back, the front side plate of the main body [C] holds the drum stopper [A] out of the drum lock.

6.5 DRUM LOCK MECHANISM 3



C223D546.img

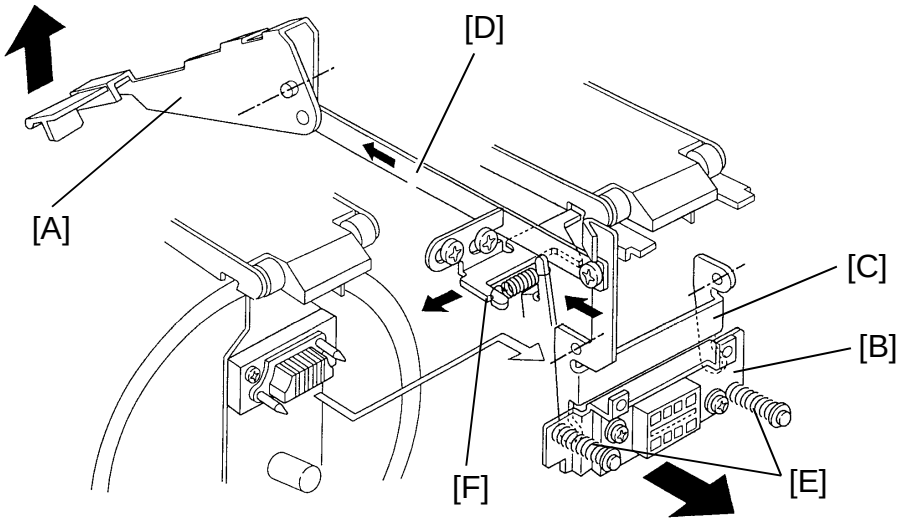


C223D547.img

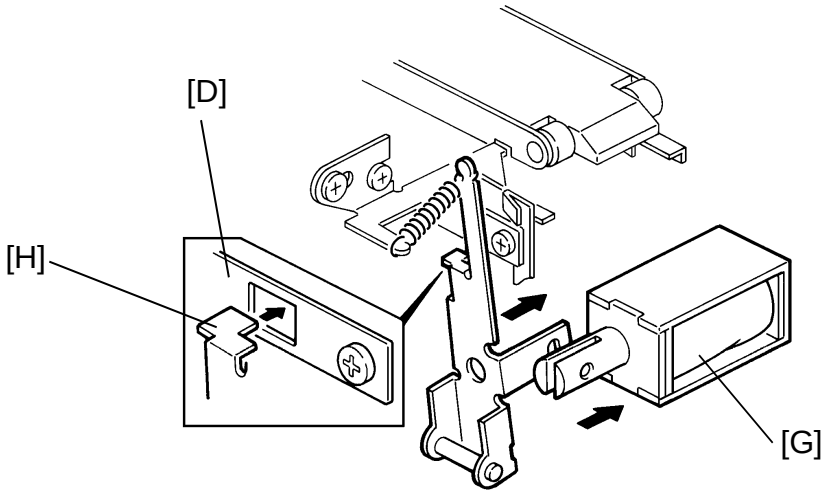
When the drum is pulled out, the drum stopper [B] drops into the hole (see the above diagram). This stops the drum unit from being pulled out any further. Now, if the operator pulls handle [A], the drum unit won't fall out.

When the operator pulls stopper release [D] in the direction of the arrow, the drum stopper [B] is pushed up to the level of the drum rail cover [C]. This allows the drum to be removed.

6.6 DRUM CONNECTION MECHANISM/DRUM LOCK MECHANISM 4



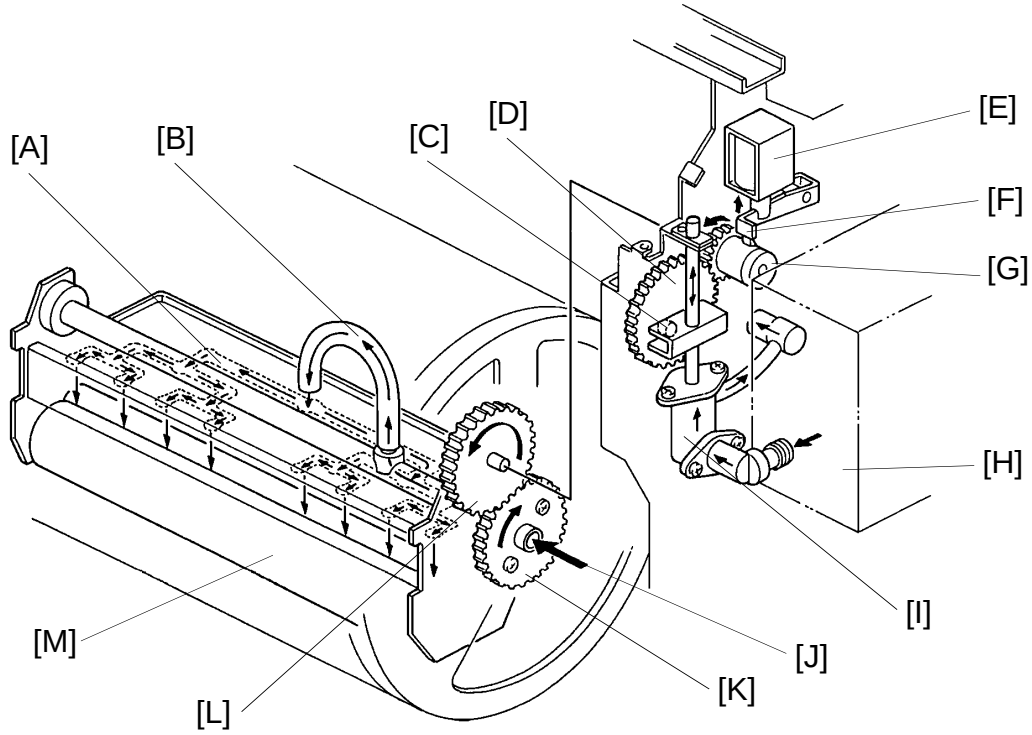
C223D548.img



C223D549.img

When the drum release lever [A] in front of the machine is raised, the connector [B] is pushed away from the drum by the bracket [C] through the link [D], and is disconnected. The bracket [C] also pushes the drum lock lever [F] to release the drum lock allowing the drum to be removed. While the drum is away from its home position, the drum lock solenoid [G] is energized and the stopper [H] locks the link [D] to prevent the drum from being pulled out during a print cycle. The solenoid is de-energized when the drum stops at the home position (when the 1st drum position sensor is actuated).

6.7 INK SUPPLY MECHANISM



C223D550.img

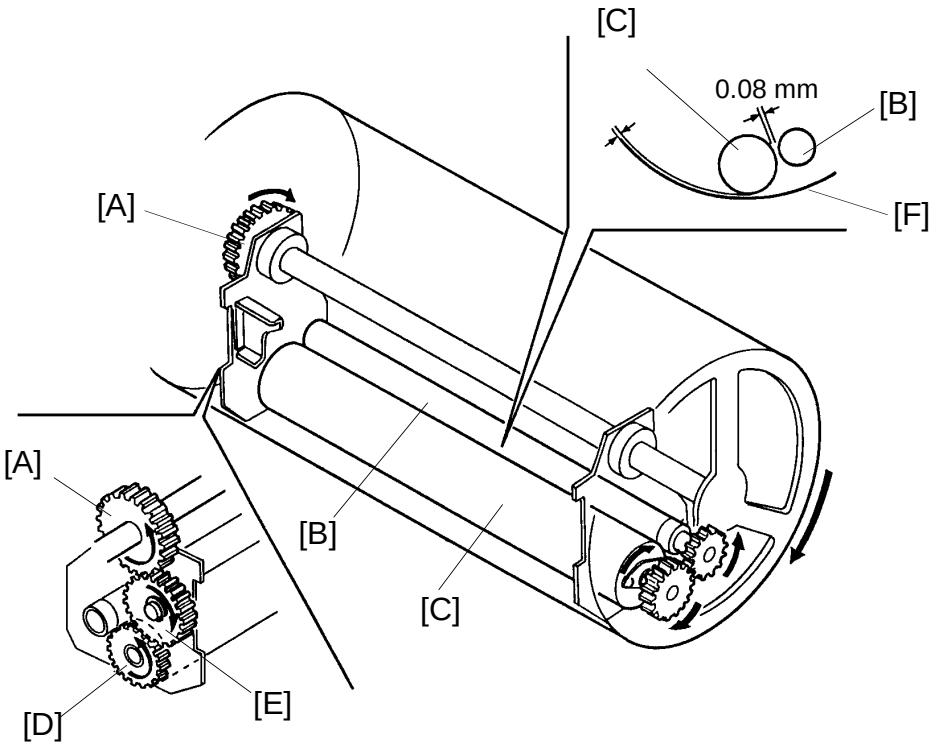
Ink is supplied from the ink cartridge [H] to the ink roller [M] by the ink pump [I] and then through 8 holes in the ink distributor [A].

Drum rotation is transmitted from gear [K] to gear [L], then to the gear of the spring clutch [G]. However, the rotation is not transmitted to gear [D] because of the spring clutch [G].

When the ink detector detects less ink on the ink roller [M], the ink supply solenoid [E] turns on, and the ink supply stopper [F] releases clutch [G] allowing the gear [D] to turn.

The pin [C] moves the pump shaft up and down as the gear [D] rotates. (One stroke of the ink pump occurs for every 2 rotations of the drum.) Therefore, the ink in the ink cartridge is sucked into the pump [I]. The pump then sends the ink out into the drum shaft [J]. Then, the ink goes from the ink distributor [A] onto the ink roller [M] through the tube [B].

6.8 INK KNEADING MECHANISM



C223D551.img

The ink kneading mechanism consists of the ink roller [C] and the doctor roller [B]. The ink roller [C] rotates with the drum and the doctor roller [B] ensures that the ink goes evenly to the ink roller.

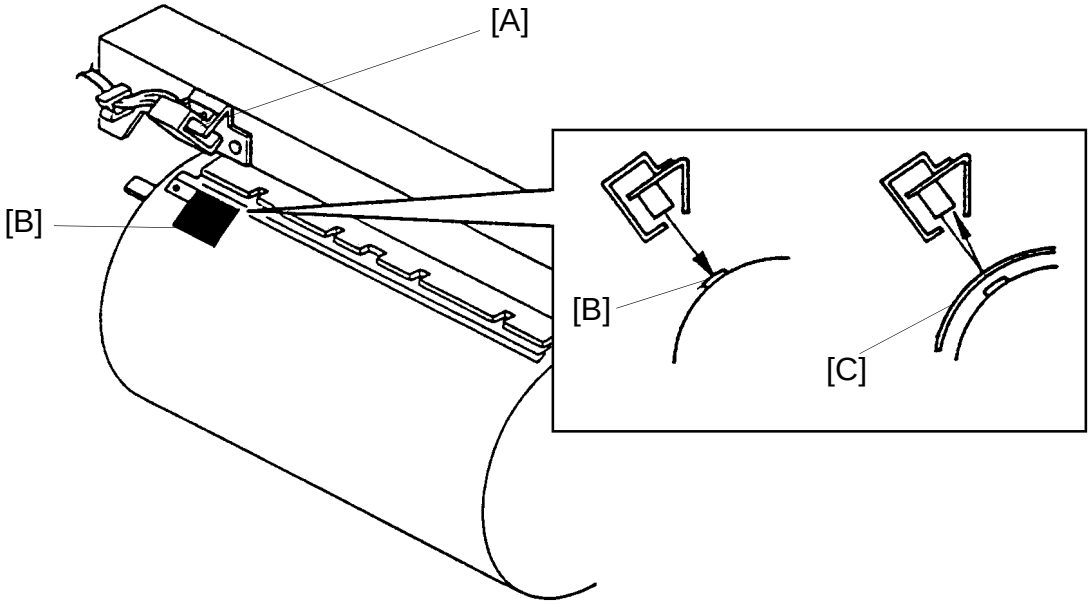
The ink roller [C] rotates with the drum this way: the drum turns a gear [A], the gear [A] turns an idle gear [E], and the idle gear [E] turns the roller gear [D]. The gear [D] is mounted on the ink roller.

The doctor roller is adjusted to give a distance of 0.08 millimeter between itself and the ink roller. It rotates to create an even thickness of ink.

The ink roller does not touch the screen [F] when the machine is not printing. However, during the printing process, the ink on the ink roller goes to the paper through holes in the screen and the master. This happens while the drum screen is held against the master by the pressure roller located under the drum.

During the master eject process, the drum rotates in the reverse direction but the ink roller does not rotate at all; the gear [D] has a one-way clutch to prevent that.

6.9 DRUM MASTER DETECTION



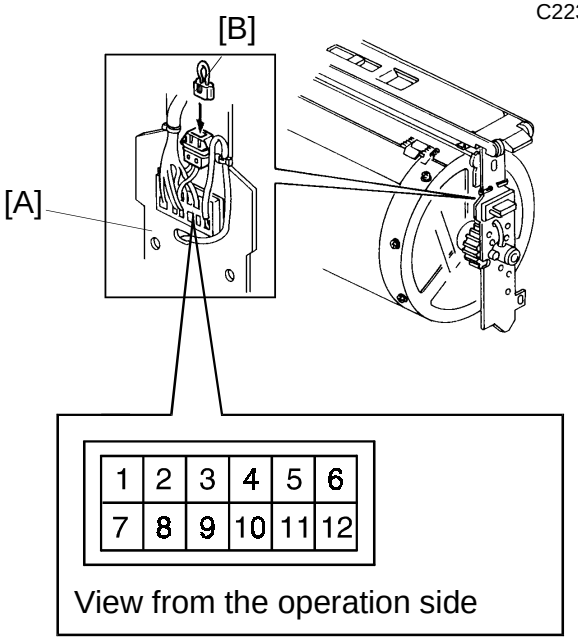
C223D552.img

The drum master sensor [A] is mounted on the drum rail and it detects whether a master is on the drum.

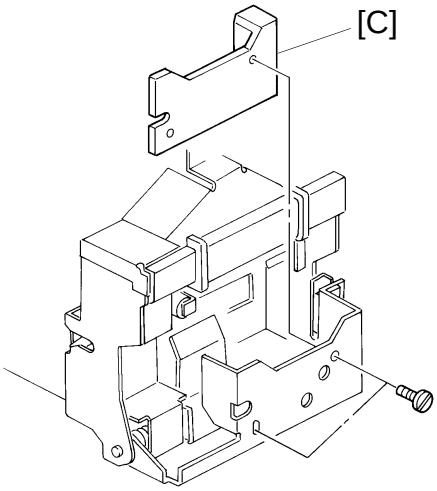
When there is a master on the drum, the black patch [B] is covered and the sensor detects the light reflected from the master [C]. Printing starts when the Print Start key is pressed.

When there is no master on the drum, the black seal is exposed. The black seal does not reflect light back to the sensor. The "M" indicator on the display panel blinks and printing does not start when the Print Start key or the Proof key is pressed.

C223D616.img



Terminal Numbers



C223D618.img

The machine identifies the drum type electrically. Depending on which terminals of the drum unit connector [A] are connected, the corresponding indicator lights up on the operation panel as follows:

Drum Type	Indicator	Terminal Number			
		2	3	4	5
A3/DLT (Original)	A3 or DLT Indicator	1	0	1	0
A3/DLT (Option)	A3 or DLT and Color Indicators	1	1	1	0
A4/LT (Option)	A4 or LT Indicator	1	0	1	1

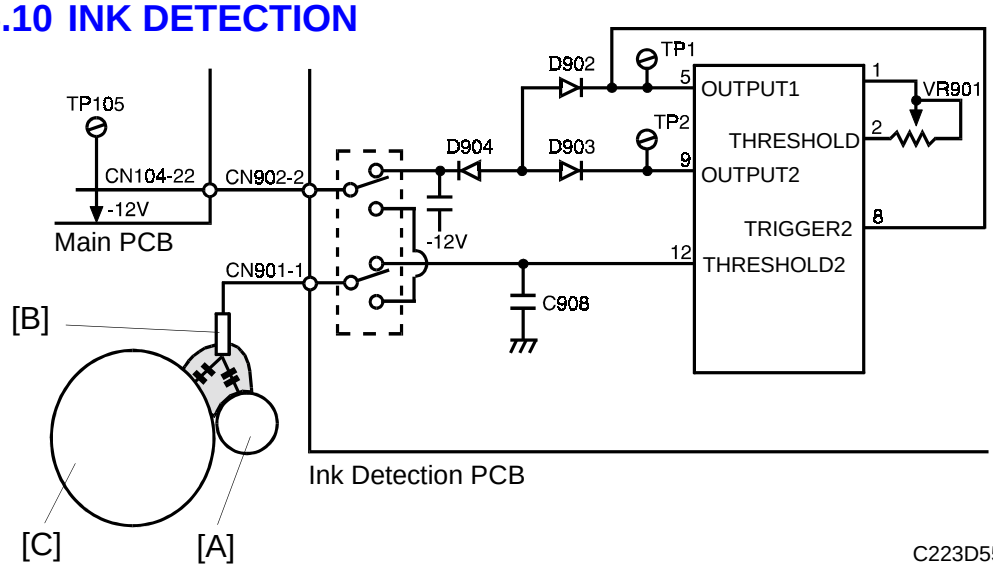
1: Connected, 0: Not connected

To use the A4/LT drum with color ink, terminals no. 2 and no. 3 should be linked using a short connector [B]. This will turn on the color indicator. The short connector is an accessory of the unit, and is included with it.

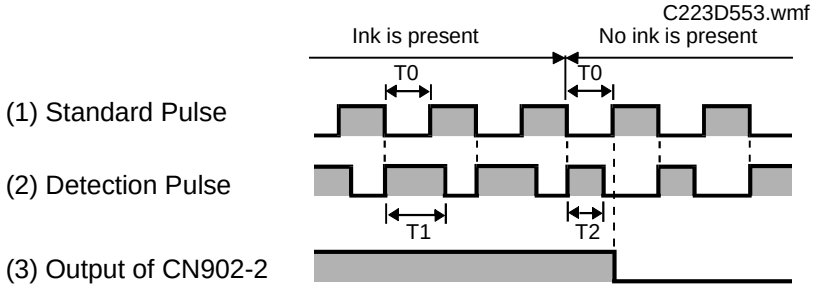
NOTE: * To use the A4/LT drum with black ink, it is not necessary to use short connector [B].

* To use a 1000 cc black ink cartridge with the drum, the ink holder spacer [C] must be removed. The ink holder spacer is originally installed in the optional A3/DLT and A4/LT drums and is necessary only for the 600 cc ink cartridges.

6.10 INK DETECTION



C223D553.wmf



Ink Detection Circuit

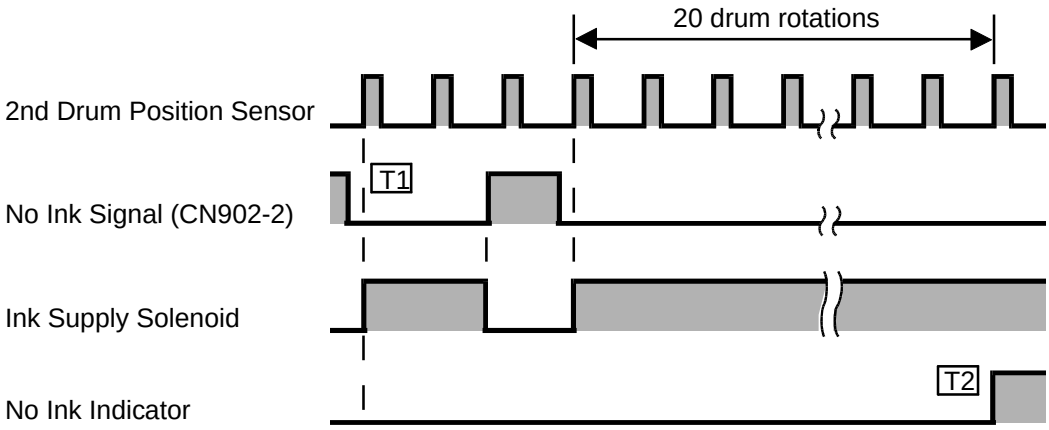
C223D554.wmf

The detecting pin [B] works like the electrode of a capacitor. The capacitance between this pin and the ink roller [C] depends on the presence or absence of ink, and it affects the duty cycle of the detection pulse generated by the ink detection PCB. The detection pulse is compared to a standard pulse to detect whether there is ink in the drum or not.

(1) The standard pulse is output from OUTPUT 1. The pulse length (T_0) can be adjusted by adjusting VR901.

(2) OUTPUT 2 is the detection pulse. The duty cycle is determined by C908 and the electrostatic capacity between the detection pin and the ink roller [C] or doctor roller [A] (ground). The detection pulse is triggered by the falling edge of the standard pulse that is input from TRIGGER 2. When ink is present, the electrostatic capacity increases and the pulse length (T_1) becomes longer. On the other hand, when ink is not present, the pulse length (T_2) becomes shorter as the electrostatic capacity decreases.

(3) The pulse length (T_1 or T_2) is compared with the standard pulse (T_0). When the pulse length is shorter than the standard pulse (T_0), the output of CN902-2 goes low, indicating that there is no ink.



C223D555.wmf

Ink Detection Timing

T1: When there is no ink left on the ink roller and the no ink signal (output of CN902-2) is low (indicating that there is no ink), the ink supply solenoid turns on at the next rising edge of the second drum position sensor signal. The ink supply solenoid turns off when CN902-2 goes high.

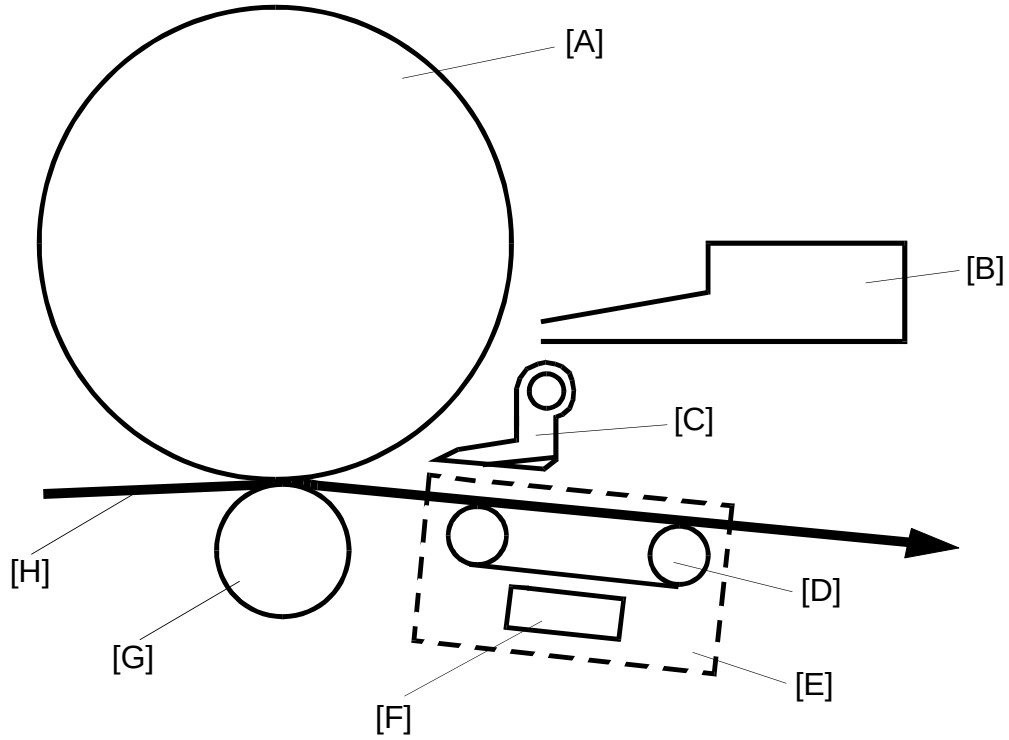
T2: If the no ink signal remains low when the drum has made 20 rotations since the ink supply solenoid turned on, the No Ink indicator blinks.

When this happens and when the "Reset" key is pressed, the drum turns 40 times to supply ink; this is the user's procedure for supplying new ink. (When the "0" key is pressed while pressing the "Reset" key, the drum turns 40 times even when the No Ink indicator is not blinking: this is a technician's test procedure.)

When the No Ink Signal goes high during the 40 drum rotations, the indicator goes off and the ink supply solenoid is de-energized.

7. DELIVERY

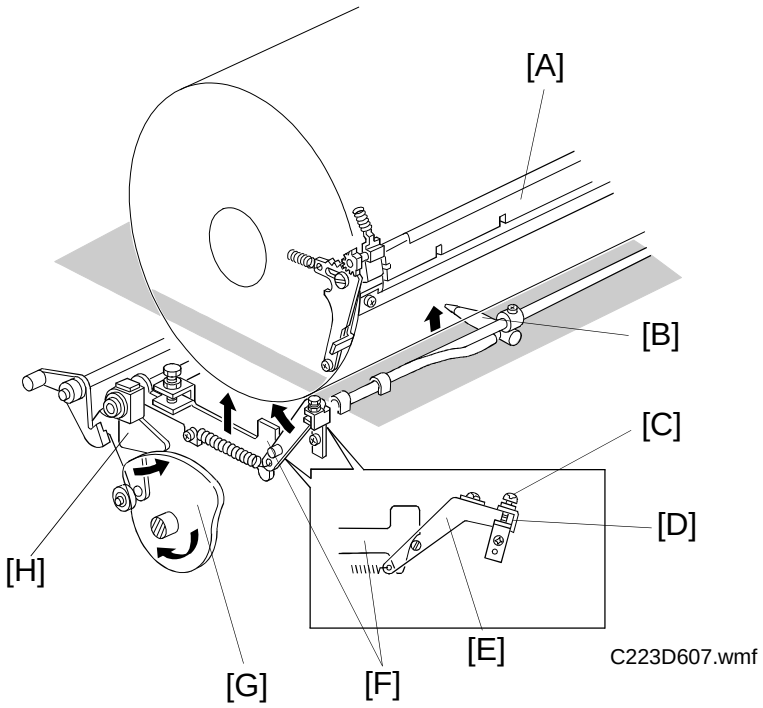
7.1 OVERALL



[D]: Belt
[F]: Vacuum Fan
[G]: Press Roller
[H]: Paper

The exit pawl [C] and the air knife [B] separate the paper from the drum [A] and the vacuum fan [F] in the transport unit [E] pulls the paper against the belt [D] as the belt moves the paper to the delivery table.

7.2 EXIT PAWL DRIVE MECHANISM



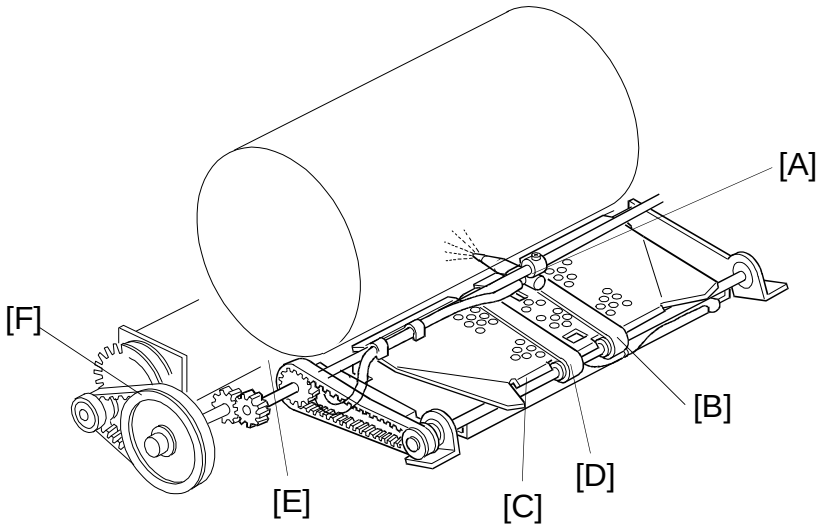
The exit pawl [B], located in the center of the drum, guides the center of the printing paper. As the master clamper [A] approaches the exit pawl, the exit pawl moves away from the drum.

When printing pressure is applied to the drum, the narrowest part of the pressure cam [G] comes to the bearing on the pressure on/off lever [H], and the lever [H] turns counterclockwise. The exit pawl drive cam [F] is connected to the pressure on/off lever [H] and so the cam [F] moves up. The exit pawl lever [E] then turns clockwise as it moves along the surface of the exit pawl drive cam [F]. Therefore, the exit pawl also comes near the drum until the stopper [D] contacts the adjusting screw [C]. This keeps a small clearance between the exit pawl and the drum surface to ensure the printing paper will be fed to the vacuum unit.

As the press roller moves away from the drum (the widest part of the cam [G] comes to the bearing on the pressure on/off lever [H]), the exit pawl drive cam [F] moves down and the exit pawl lever [E] turns counterclockwise. This causes the exit pawl [B] to separate from the drum.

The exit pawl [B] is held away from the drum when printing pressure is not applied.

7.3 VACUUM UNIT DRIVE MECHANISM



C223D608.wmf

The vacuum fan (below the transport belts) holds the paper against the transport belts [D]. The transport belts move the paper to the delivery table.

Wing guides [C] at each end of the vacuum unit help keep the back side of the printing paper clean.

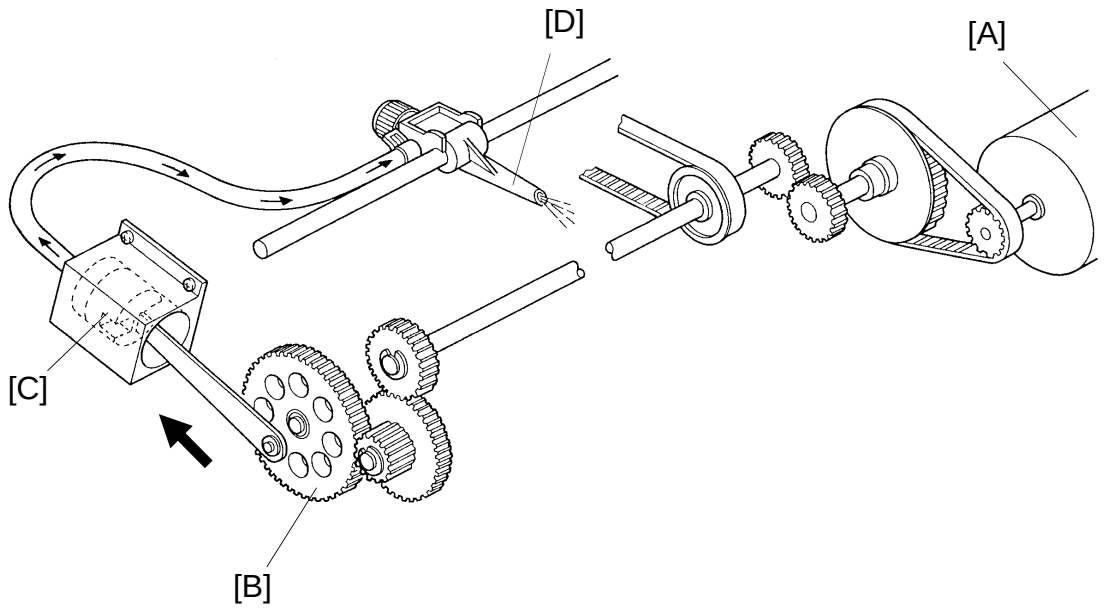
When the main motor turns on, the gear [F] mounted on the main motor shaft drives a drive shaft [E] through gears and belts. This drive shaft turns the transport belts.

The first and second paper exit sensors [A] and [B] check for paper jams.

The paper exit jam check is done when printing pressure is applied and the printing pressure sensor is interrupted.

Jam Condition	Sensor Status
Delivery Misfeed	The 2nd paper exit sensor is still on when the 2nd drum position sensor turns on.
Paper Wrap	The 1st paper exit sensor fails to turn on even though the drum has rotated 20° after activating the 2nd drum position sensor.
Paper Wrap	The 2nd paper exit sensor fails to turn on even though the drum has rotated 25° after activating the 1st drum position sensor.

7.4 EXIT PAWL AIR PUMP MECHANISM

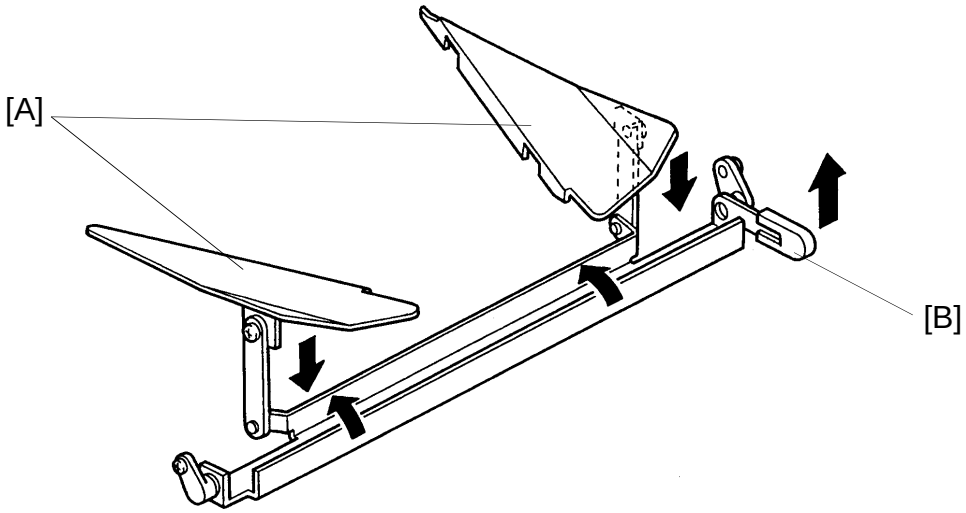


C223D609.img

The main motor [A] turns a gear [B] through idle gears, a belt and a shaft. The gear [B] rotates and drives the piston [C] back and forth.

The piston moves forward and pushes a jet of air out through the nozzle [D]. This jet of air helps push down on the paper and separates it from the drum.

7.5 WING GUIDE MECHANISM



C223D620.img

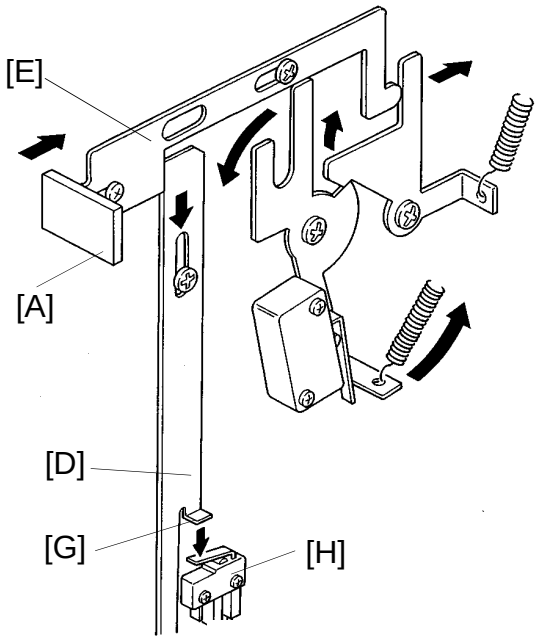
The wing guide [A] lifts up the sides of the paper as it exits the machine.

This stiffens the paper so that the leading edge of thin paper will not sag and brush against the sheets on the delivery table. This prevents the ink on freshly printed sheets from being smeared.

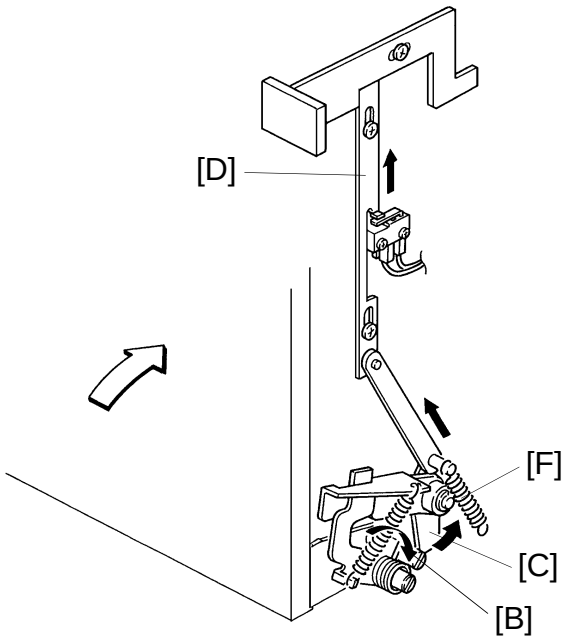
The angle of the wing guide can be changed by moving the guide release lever [B]. Usually, the wing guide release lever is set to the lower position to raise the wings. If printed pages do not stack evenly or if the pages pass over the end fence, raise the lever to the upper position to release the wings.

7.6 PAPER DELIVERY TABLE

7.6.1 Master Eject Unit Lock Mechanism



C223D578.img



C223D559.img

The master eject open button [A] locks when the paper delivery table is closed. This prevents the paper delivery table from opening suddenly when the user presses the master eject open button.

This lock mechanism functions as follows:

- As the paper delivery table is closed, the pin [B] located on the front of the paper delivery table pushes down on lever [C] which raises arm [D]. When arm [D] is in the upper position, lever [E] cannot move forward.
- When the delivery table is opened, arm [D] is pulled down by the tension spring [F] and lever [E] can move forward.
- The projection [G] on arm [D] contacts the delivery table open switch [H], which sends a signal to inform the main PCB that the delivery table is open.

7.6.2 Paper Delivery Table Angle

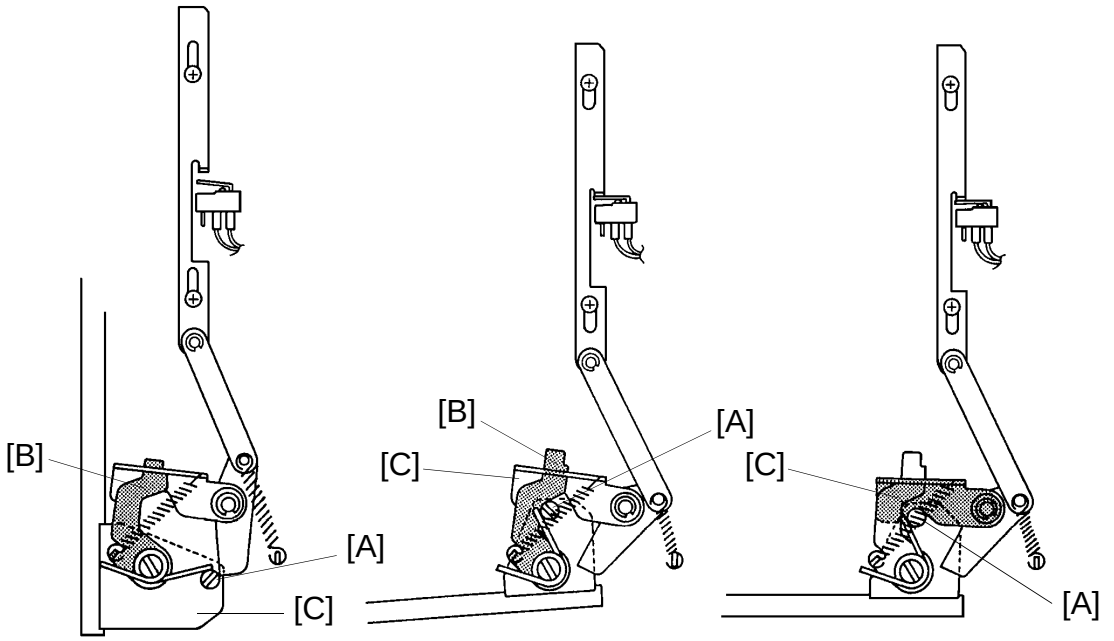


Fig. 1: Closed

Fig. 2: 10° slant

Fig. 3: Level

C223D560.img

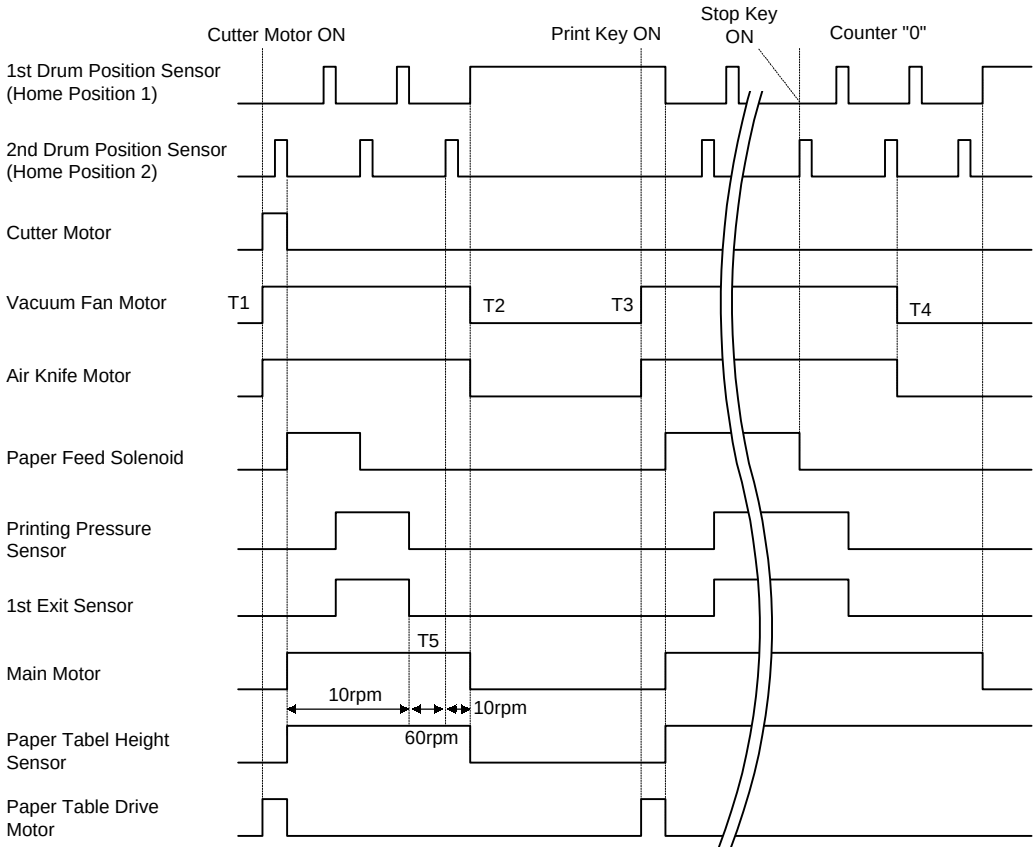
There are two paper delivery table open positions.

As the paper delivery table is lowered from the closed position (fig. 1), the pin [A] fixed to the table side frame moves forward and pushes the stopper [B] forward. This disengages the lever [C] from the stopper (fig. 2) with a audible click and the table stops at a 10° downward slant when the pin reaches the end of the slot cut in the side frame.

When the delivery table is slightly raised up from the 10° downward slant position, spring tension pulls the lever downward and the pin engages the lever. This stops the table at the level position.

Normally, the table should be at a 10° downward slant. This prevents the leading edge of each sheet from rubbing against the other sheets on the table as the sheet is fed out, and ensures that the leading edge of the sheet being fed out will not smear the ink on the top printout that is on the paper delivery table. However, small sheets of paper sheets may pass over the end fence if the table is at the 10° downward slant position. If this happens, the user should raise the table to the level position.

7.7 ELECTRICAL TIMING



C223D561.wmf

T1: The cutter motor, vacuum fan motor, air knife motor, and main motor turn on.

T2: The vacuum fan motor and the air knife motor turn off the next time the 2nd drum position sensor is deactivated after the printing pressure sensor turns off.

T3: When the Print Start key is pressed, the vacuum fan motor and the air knife motor turn on when the paper table height sensor is activated.

T4: When the counter indicates "0" and the 2nd drum position sensor is activated, the vacuum fan motor and air knife motor turn off.

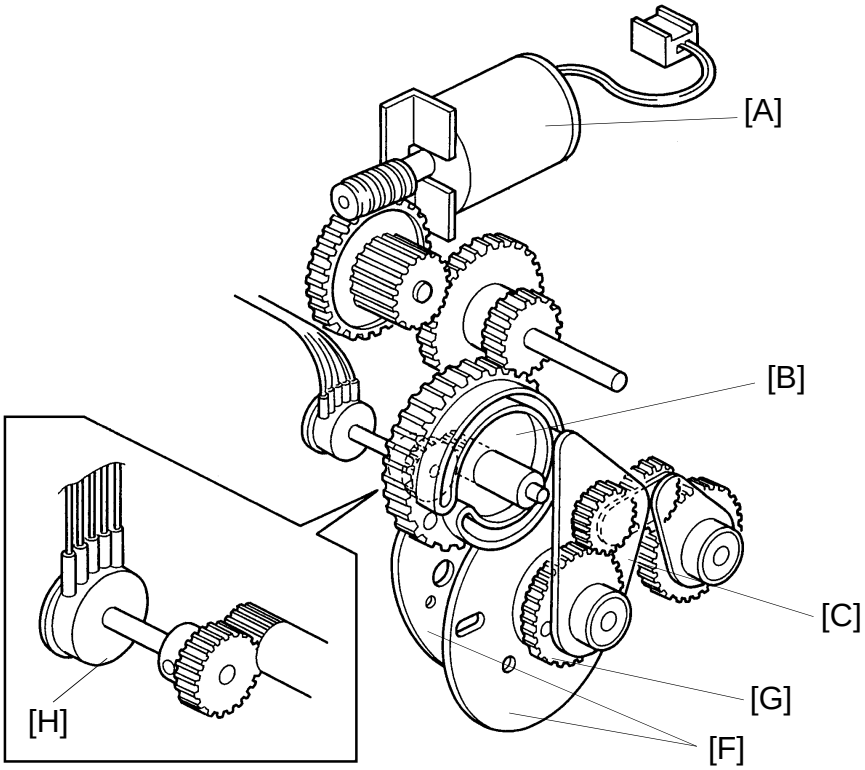
T5: When the 1st exit sensor and the printing pressure sensor turn off, the main motor speed increases to 60 rpm to ensure paper delivery to the exit table.

8. IMAGE POSITIONING

8.1 OVERALL

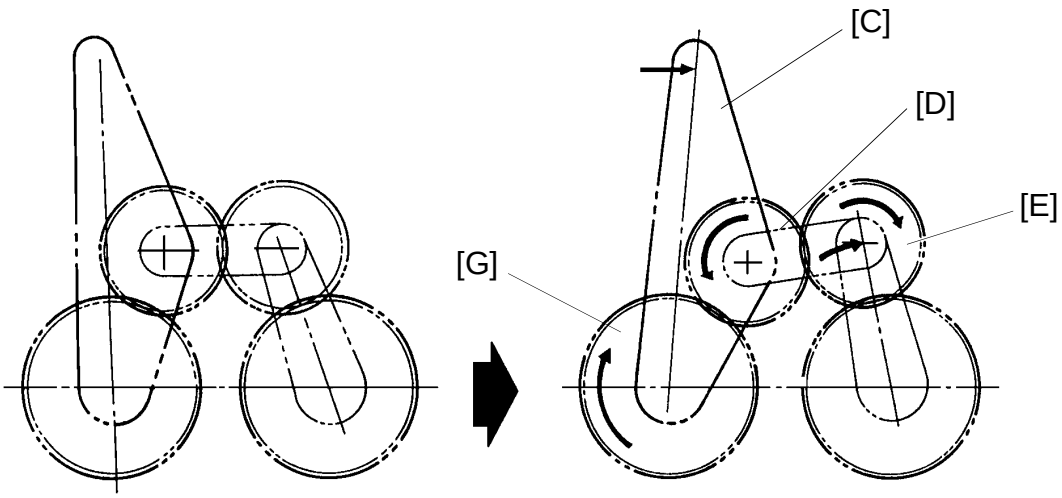
In image positioning mode, the image can be shifted 20 mm (5 mm steps) up and –15 mm down on the page by pressing the forward or backward Image Position key on the operation panel. This rotates the first and second paper feed roller cam a small distance to change the paper feed timing in relation to the drum rotation timing.

8.2 IMAGE POSITIONING MECHANISM



C223D562.img

Continued on the next page



C223D563.img

When the forward Image Position key on the operation panel is pressed, the image positioning motor [A] turns and drives cam gear [B] clockwise a short way through gears.

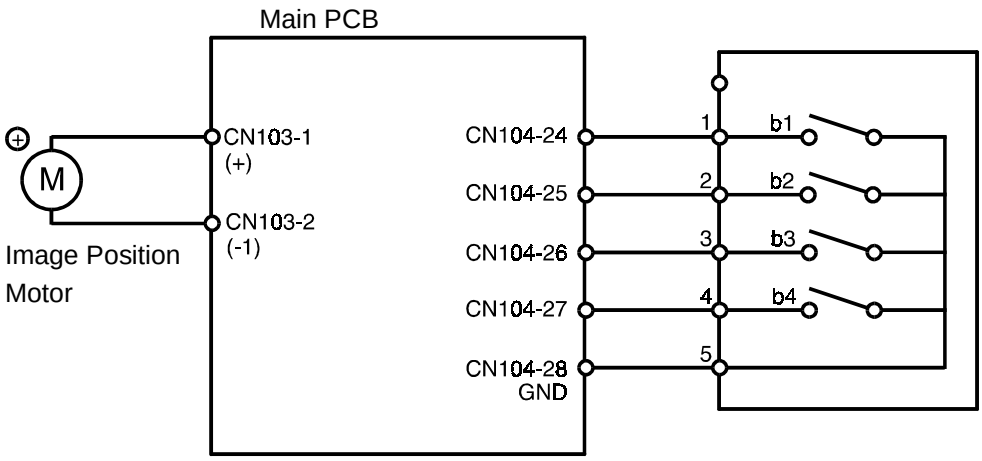
The cam gear has a spiral track along which the lever [C] moves. When the cam gear turns clockwise a short way, the pin on the lever [C] moves towards the outside of the cam gear and the lever turns clockwise a short way.

The lever [C] drives gear [E] clockwise a short way through gear [D] and the first paper feed roller and the second paper feed roller cams [F] mounted of the shaft on gear [G] turn clockwise a short distance.

As a result, the paper feed start timing is delayed in relation to the drum rotation timing and the image position is moved in the forward direction. (Refer to the Paper Feed section for details on the cam mechanism.)

The image position is detected by the image position sensor [H] which is located behind the cam gear [B].

8.3 CIRCUIT



C223D564.wmf

When the forward Image Position key is pressed, CN103-2 goes to 22 V and CN103-1 goes to 0 V, and the image positioning motor turns to advance the paper feed timing.

When the backward Image Position key is pressed, CN103-1 goes to 22 V and CN103-2 goes to 0 V, and the image positioning motor turns to move back the paper feed timing.

The main PCB detects the image position by means of a four-bit signal received from the image position sensor. The image positioning motor turns off when the image is at the selected position.

Nine different image position settings can be selected by pressing the Image Position key.

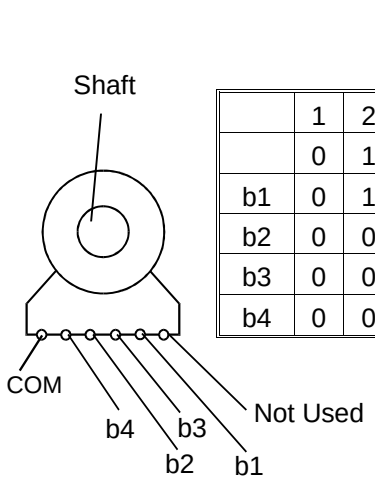


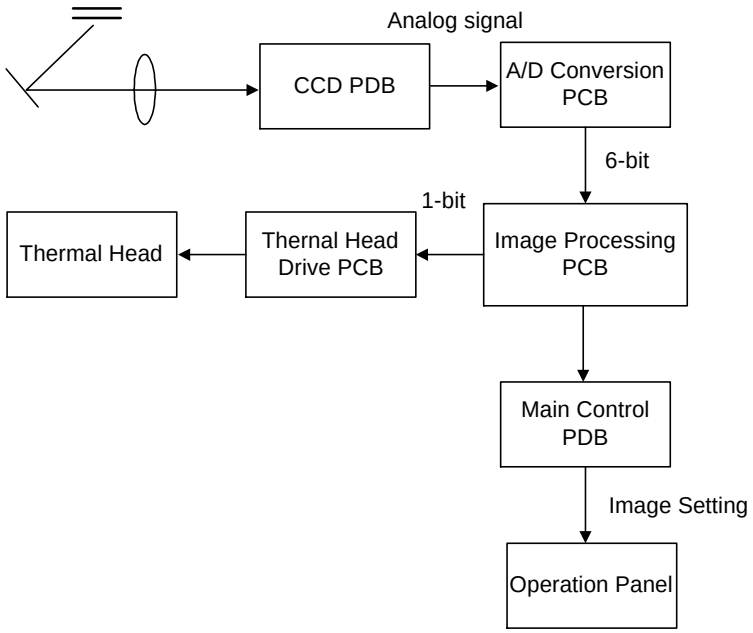
	Image Position Area															
	(+)					0						(+)				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	0	1	3	2	6	7	5	4	C	D	F	E	A	B	9	8
b1	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
b2	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
b3	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0

1 = Switch is on
0 = Switch is off

C223D600.wmf

9. IMAGE PROCESSING

9.1 OVERVIEW



C223D579.wmf

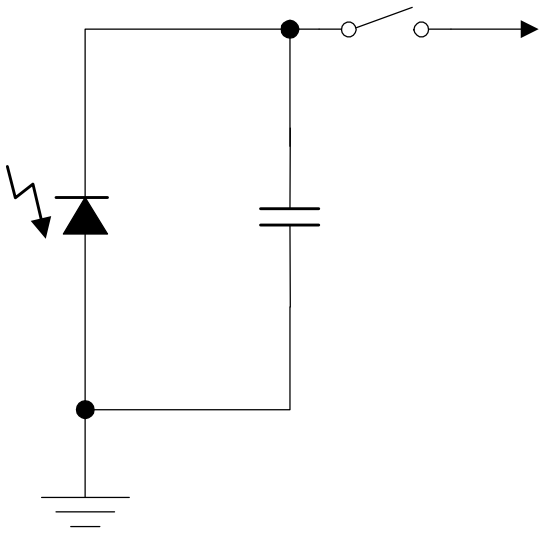
The light reflected from the original goes to the CCD, which converts the light signal into an analog electrical signal. The analog signal is sent to the A/D conversion PCB, where it is changed to 6-bit digital data. The 6-bit data is changed to 1-bit data in the image processing PCB and the image processing PCB drives the thermal head through the thermal head drive PCB to make an image on the master with the 1-bit data.

The 6-bit to 1-bit conversion procedure depends on the image settings on the operation panel.

9.2 CCD (CHARGE COUPLED DEVICE)

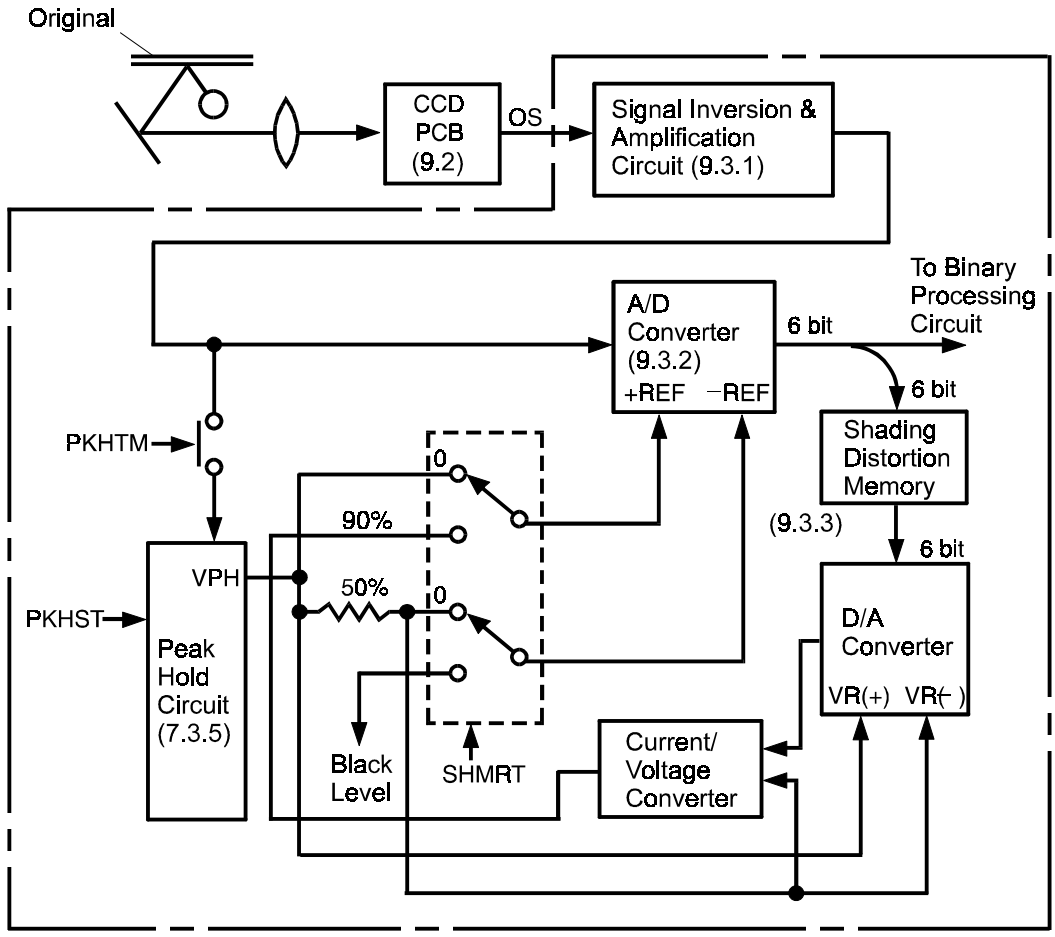
The light reflected from the original reaches the CCD (Charge Coupled Device). The CCD reads one complete scan line at a time.

The basic circuit of each CCD element is shown below. The light reflected from the original is detected by a photodiode. A capacitor stores the resulting electrical charge, which depends on the light intensity. The CCD used in this model has 5416 sets of such photodiodes and capacitors in series. The electrical charges from the CCD elements are sent to the A/D conversion PCB one after the other (this is the OS signal). To increase the scanning speed, the odd and even pixel data are handled separately.
The CCD consists of 5416 elements. The first 64 elements are dummy elements which are not used for image data. The following 5340 pixels are effective elements. All the data for one scan line across the original image are converted into electrical charges and stored in the capacitors of these elements. After the effective elements, there are 12 more dummy elements.



C223D580.wmf

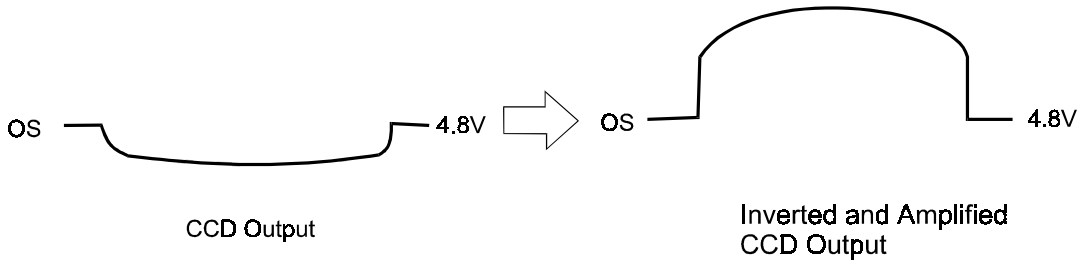
9.3 A/D CONVERSION



C223D581.wmf

The analog signal generated from the CCD is inverted and amplified in the A/D conversion PCB. The analog signal is converted into 6-bit digital data which is sent to the image processing PCB. The original background and the distortion of the light path are monitored to obtain accurate image data.

9.3.1 Inversion and Amplification



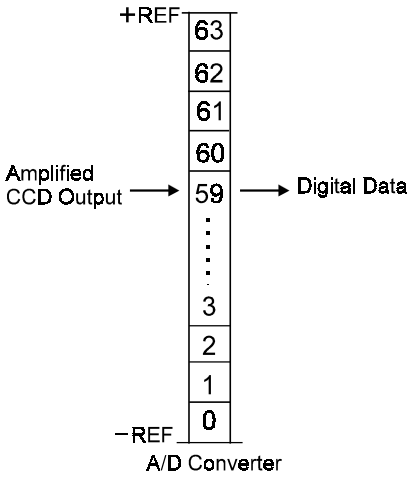
C223D582.wmf

The analog signal (OS) from the CCD is output to the A/D conversion PCB. It is sent as a negative signal in relation to the dc bias voltage (which is approximately 4.8 V). In the A/D conversion PCB, the negative signal is inverted and amplified before being converted to digital.

The amplification ratio can be changed using VR601 on the A/D conversion PCB.

9.3.2 A/D Converter

The inverted and amplified CCD output is sent to the A/D converter. The A/D converter can produce 64 gray scale steps. To make the 64 steps, the difference in voltage between the high reference voltage (+REF) and the low reference voltage (-REF) is divided into 64. The amplified CCD output voltage is digitized based on these steps. If the amplified CCD output voltage is higher (the image pixel is lighter), a higher value is the result.
The digitized image data are sent serially to the main control PCB.



C223D583.wmf

9.3.3 Shading Distortion Correction

The image data from one main scan line sent from the CCD does not exactly represent the line from the original image, because of the following reasons:

1) Loss of brightness towards the ends of the exposure lamp and the edges of the lens.

2) Variations in sensitivity among elements of the CCD

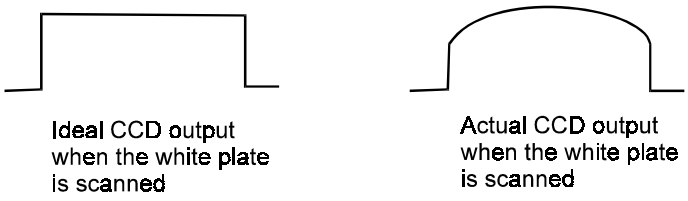
3) Distortions of the light path

Such distortions in the image data are corrected when they are converted into digital data.

Before scanning the document, the scanner reads the white plate on the back of the original scale. The output of each CCD element is changed to a 6-bit digital value and stored in the shading distortion memory.

To change the analog shading distortion signals to digital data, a scale of 64 steps is made between the whitest level when the white plate is scanned and 50% of the whitest level. Using this scale, the analog signal is changed to 6-bit digital data.

While an original is scanned, the 6-bit shading distortion value for each pixel is serially sent from memory to the D/A converter, synchronizing with the image signal being sent to the A/D converter. The D/A converter changes the distortion value to electrical current. The current is converted to the voltage to be used as high reference data for A/D conversion. In this way, the high reference voltage for A/D conversion is changed serially for each pixel depending on the shading distortion data for that pixel.

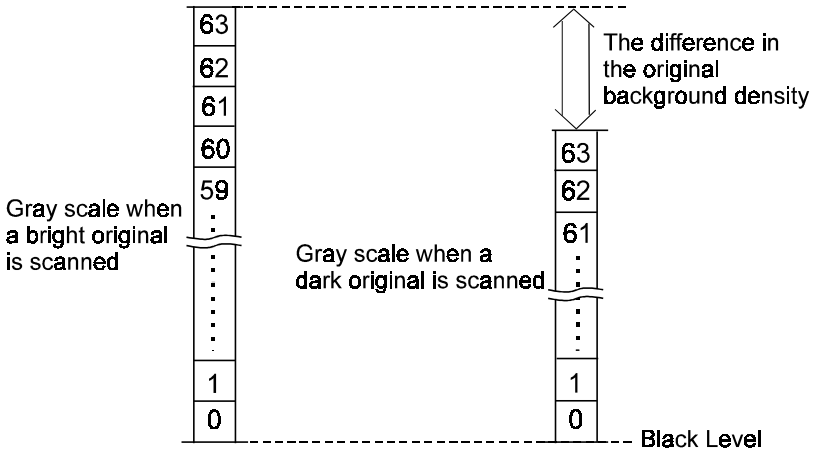


C223D584.wmf

9.3.4 Original Background Correction

When an original is scanned, the whitest level of the original background is stored, and that level is used as the white peak level for A/D conversion. The gray scale is made based on the white peak level of the original. As a result, dark background does not appear on the printout.

In the normal setting, the original background correction is done for Line mode only. In Photo mode or Line/Photo mode, the whitest level when the white plate is scanned is used for the high reference voltage. If "Yes" is selected in SP29, the background correction is also done for Photo and Line/Photo modes.



C223D585.wmf

9.3.5 Peak Hold

The peak hold circuit holds the voltage for the white peak level. Before scanning an original, it holds the white peak voltage from the white plate to make shading distortion data. When the original is scanned, it stores the white peak level of the original for the original background correction.

9.3.6 Black Level

The black level circuit always outputs a constant voltage which is used as the low reference value for A/D conversion. The black level is adjustable, and it should be the same as the output from the CCD dummy elements (optical black level).

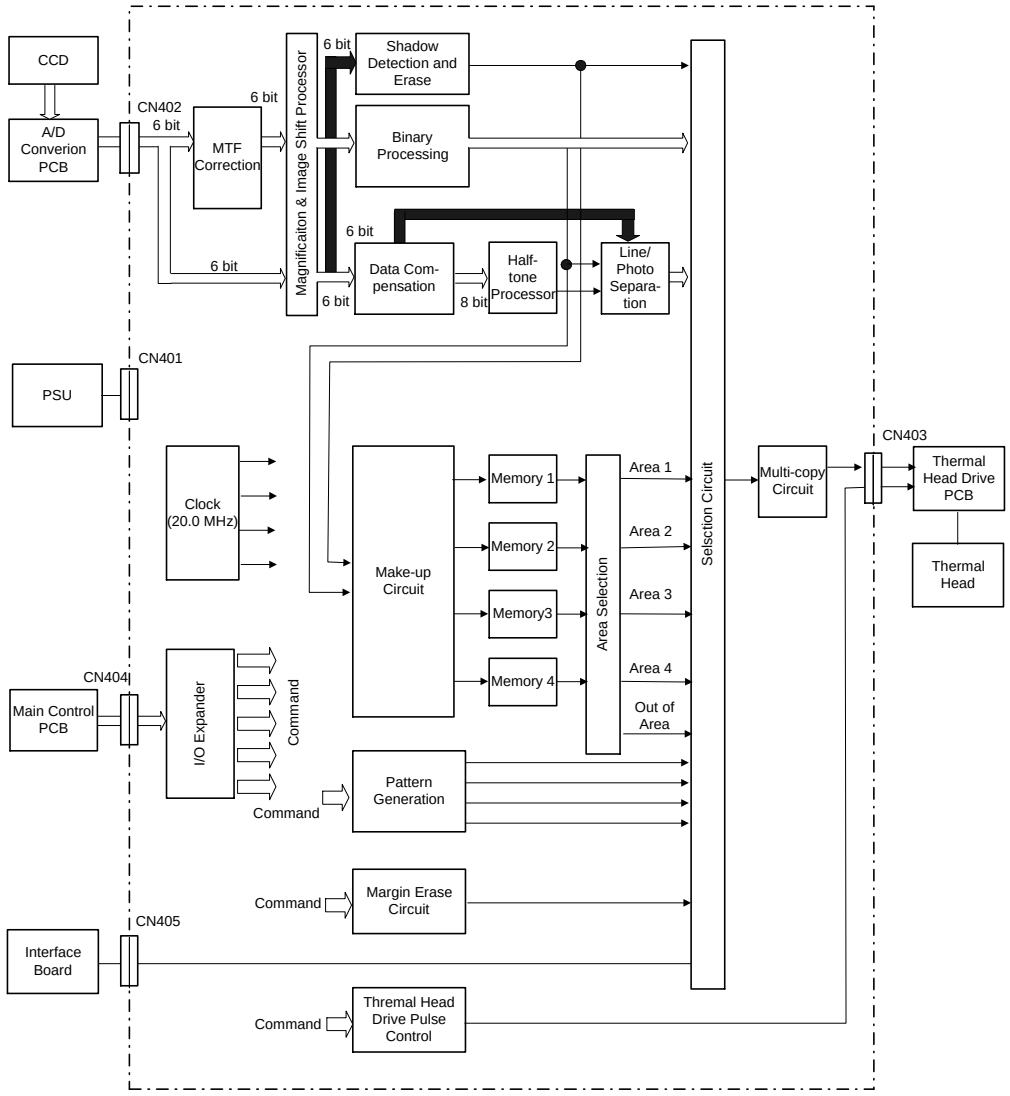
9.3.7 White Peak Limit Circuit

There is a protection circuit which limits the white peak voltage to 3.7 V. This is to prevent dark printouts resulting from an abnormally high reference voltage caused by strong light intruding into the scanner.

9.4 BINARY PROCESSING

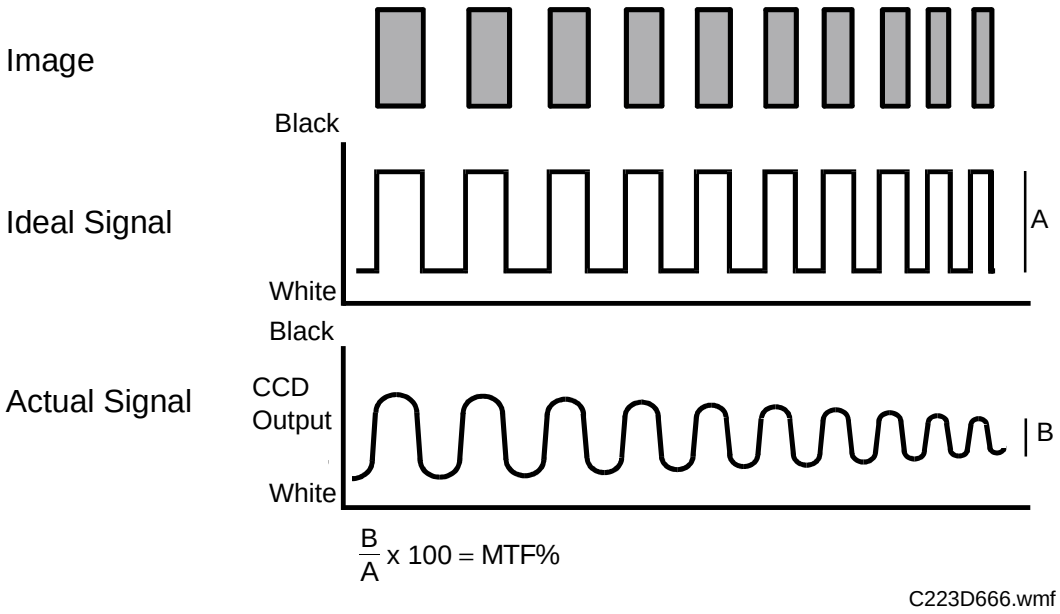
The 6-bit digital image data is sent from the A/D conversion PCB to the image processing PCB. The digital data are inverted to match the binary processing circuit of the image processing PCB. Therefore, the white peak level becomes 0, and the black level becomes 63. Then the 6-bit data is converted into 1-bit data (black or white pixels) in the binary processing circuit. The binary process for the line mode is different from that for the photo mode.

1) Line Mode: MTF (Modulation Transfer Function) Correction
2) Photo Mode: Error Diffusion or Dither Processing



C223D586.wmf

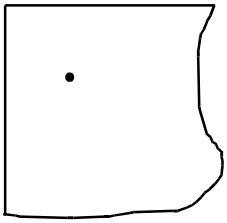
9.4.1 MTF Correction



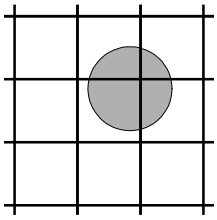
When the original image is converted to electrical signals by the CCD, the signal deteriorates and contrast is reduced. This is because neighboring black and white parts of the image influence each other. The lens' characteristics are the main reason for this. This symptom is typical when the width and spacing of the black and white areas are narrow. The ratio of the difference between the black and white levels of the electrical signal (the actual difference) and the difference between that of the original (the ideal difference) is called the Modulation Transfer Function (MTF).

If the MTF is too low, edges on the image tend to be lost. In this model, MTF correction is used to emphasize 6-bit image data in the line mode. This helps to reproduce characters better.

A target pixel value is compared with the values of the surrounding pixels and is compensated. If the surrounding pixels are very different (compared with the target pixel) then the target value will be more influenced by them. This step is repeated for all pixels of the original.



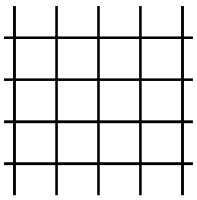
(a) Section of document



(b) Enlarged view of dot

0	0	0	0
0	12	4	0
0	30	12	0
0	0	0	0
0	0	0	0

(c) Image data after A/D conversion



(d) Print without MTF correction (threshold level: 32)

C223D667.WMF

Consider a small black point on a original as shown in the illustration (a) and (b). The 6-bit image data (range 0 to 63) for this section of the original is shown in (c). If the the threshold level is 32, all the pixels in this area will becomes single-bit white data and the image will not be reproduced (d).

The MTF correction prevents this image loss as follows:

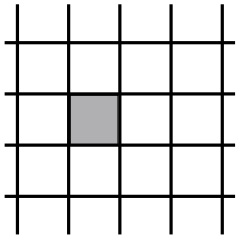
		–1/2		
–1/8	–3/8	3 X	–3/8	–1/8
		–1/2		

C223D668.wmf

The value of the target pixel is multiplied by 3. Then, 3/8 of the values of the pixels to the left and right, 1/8 of the values of the pixels two steps to the left and right, and 1/2 of the values of the pixels above and below are subtracted from the new value of the target pixel. (If the result is less than zero, then the pixel value is set to zero.)

0	0	0	0
0	19.5	1.5	0
0	63	22.7	0
0	0	0	0
0	0	0	0

(e) Image data after MTF correction



(f) Print after MTF correction

C223D624.wmf

After the MTF correction is applied, the image data of the example is as shown in (e) and (f) above. The small black point is reproduced on the print.

The correction values in the sub-scanning direction can be changed by using SP mode no. 31. The correction values for each setting of SP no. 31 are as follows:

SP31-0: Low

		–1/4		
–1/8	–3/8	2 1/2	–3/8	–1/8
		–1/4		

SP31-1: Standard

		–1/2		
–1/8	–3/8	3	–3/8	–1/8
		–1/2		

SP31-2: High

		–1		
–1/8	–3/8	4	–3/8	–1/8
		–1		

SP31-3: Maximum

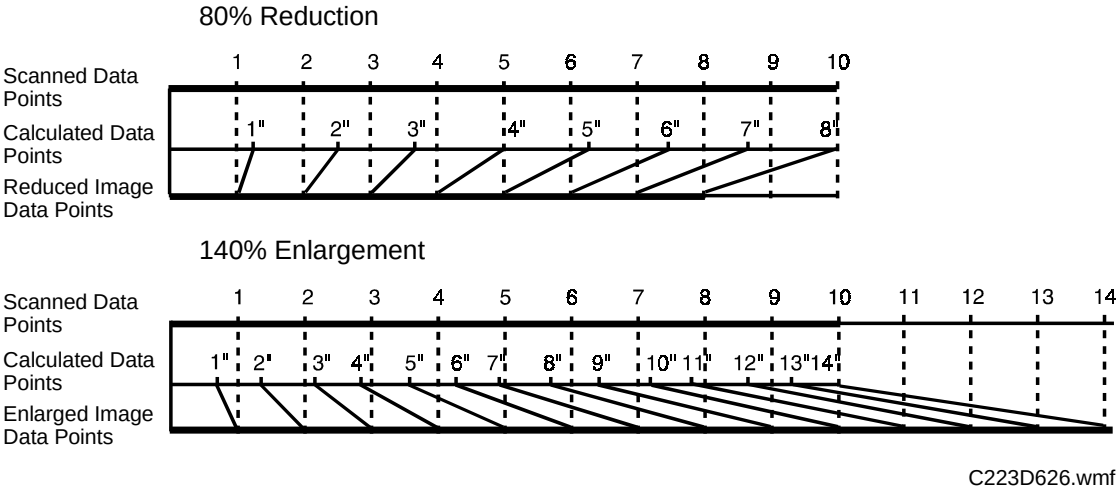
		–2		
–1/8	–3/8	6	–3/8	–1/8
		–2		

C223D625.wmf

The SP mode is normally set at 0 (factory setting). Setting it at 1, 2 or 3 will help to reproduce low contrast originals better.

NOTE: If SP31 is set to a higher level (2 or 3), stains, scratches etc. in the light path will appear on prints more easily.

9.4.2 Main Scan Magnification And Image Shift Processing


80% Reduction
Scanned Data Points
Calculated Data Points
Reduced Image Data Points
1 2 3 4 5 6 7 8 9 10
1" 2" 3" 4" 5" 6" 7" 8"
140% Enlargement
Scanned Data Points
Calculated Data Points
Enlarged Image Data Points
1 2 3 4 5 6 7 8 9 10 11 12 13 14
1" 2" 3" 4" 5" 6" 7" 8" 9" 10" 11" 12" 13"14"

C223D626.wmf

– Main Scan Magnification –

Reduction and enlargement in the sub-scanning direction is done by changing the original transport motor speed (see the diagram). Reduction and enlargement in the main scanning direction is handled by the magnification and image shift processing.

Pixels for scanning and master making are generated at fixed intervals (the CCD and thermal head element intervals). The image is scanned at the CCD element interval. If pixels on the master are plotted at the same interval (by the thermal head elements) then the master image is the same size as the original.

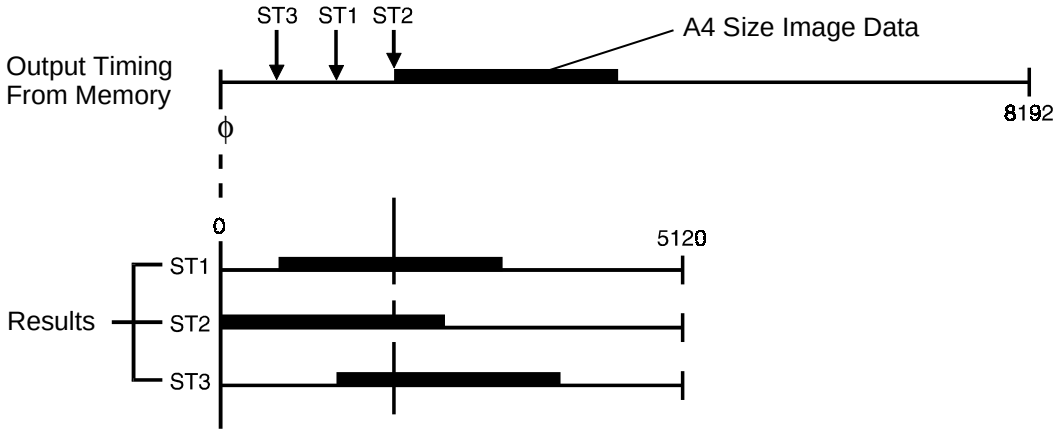
80 % Reduction

For example, data for 10 pixels in a main scan line are scanned by the CCD. Those data are compressed into data for 8 pixels by the magnification processor. As a result, the image is reduced to 80 %.

140 % Enlargement

Data for 10 pixels of a main scan line are expanded into data for 14 pixels. As a result the image is enlarged with a 140 % magnification ratio.

When actual pixels are divided in accordance with a magnification ratio, the values of the imaginary points that would correspond to new pixels are calculated by the magnification processor. The proper value for each imaginary point is calculated based on the image data of the surrounding pixel values.



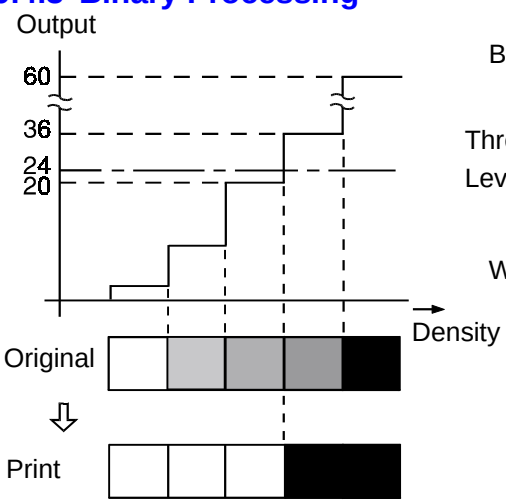
C223D627.wmf

– Image Shift –

This model can reposition the image of the original by using the image shifting mode. The image position change in the sub-scanning direction is done by changing the timing of the original scanning or of the master making process. In the main scanning direction, it is done by the magnification and image shift processor, simultaneously with the magnification process.

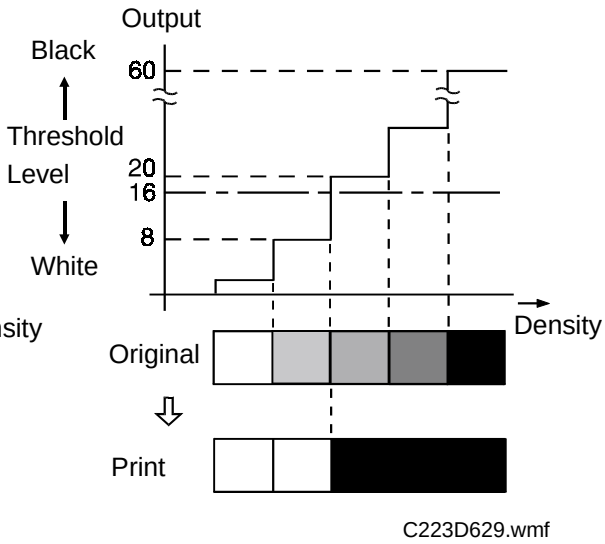
Data for one main scan line are once stored in a line memory. This memory has enough room to hold one main scan line, and it has a little extra capacity. When the data is output from memory, the output timing can be adjusted by entering the desired value in the image shifting mode.

9.4.3 Binary Processing



C223D628.wmf

[Threshold Level 24]



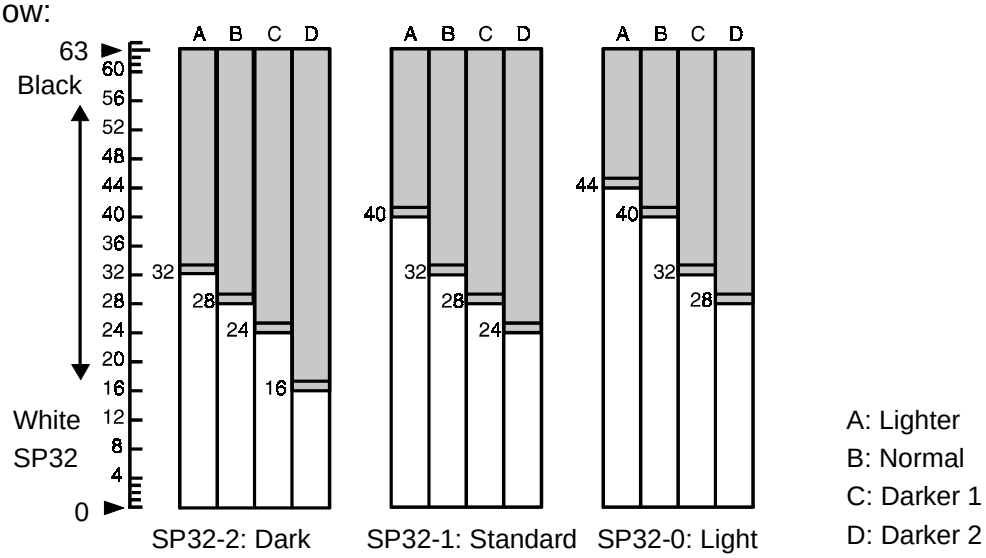
C223D629.wmf

[Threshold Level 16]

The binary processor converts 6-bit image data to single-bit white or black data to send it to the thermal head. This processor is used only for the line mode. (The binary processing for the photo mode is done by the half-tone processor.)

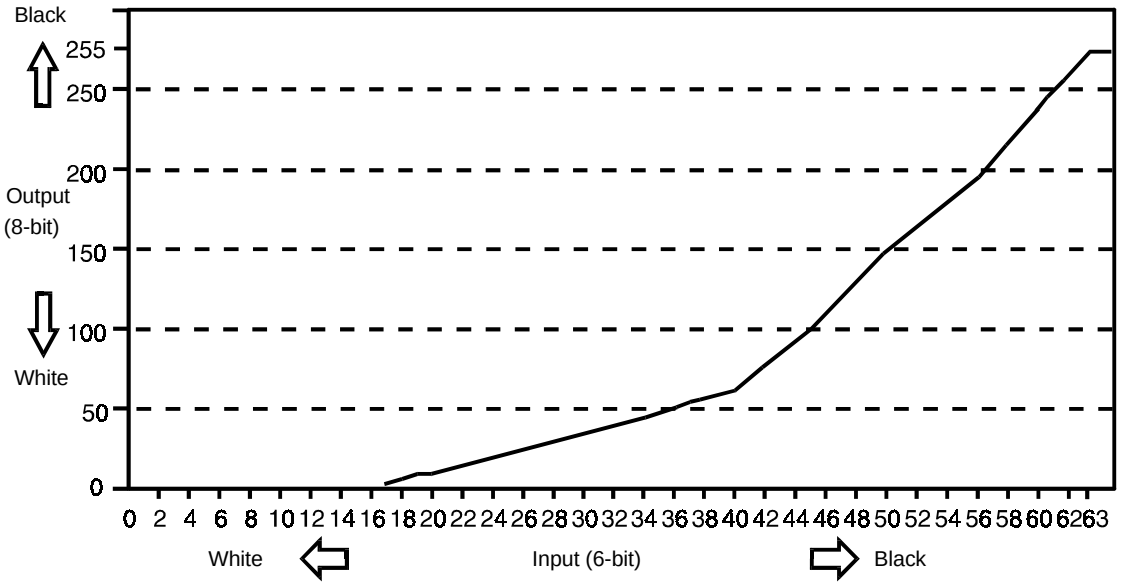
In this process, all pixel image data are compared with a single threshold level. A pixel datum is set to black if it is above the threshold level, or it is set to white if it is equal or below the threshold level. (See the above figure.)

The threshold level varies depending on the image density setting. This level is selected by the Image Density key (Lighter, Normal, Darker 1, and Darker 2). The image can also be darkened or lightened by SP mode No. 32 as shown below:



C223D669.wmf

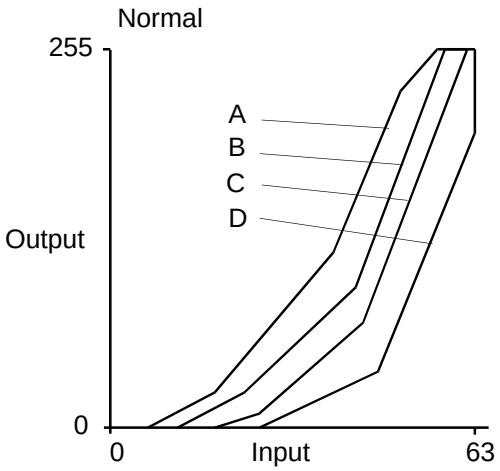
9.4.4 Photo Data Compensation Processing



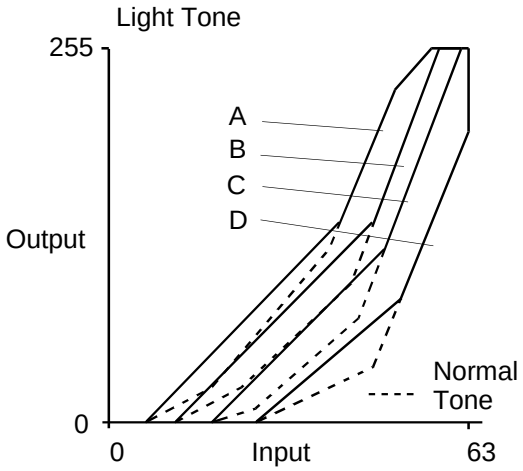
C223D670.wmf

The photo data compensation process is used only when the photo mode is selected.

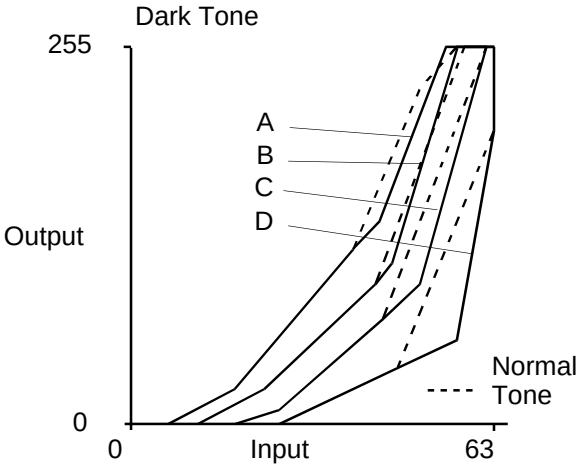
In this process, 6-bit image data are compensated based on the selected image density. The user selects the density with the Image Density key (Lighter, Normal, Darker 1, or Darker 2). When the photo mode is selected with the make-up mode, the contrast of the Normal, Light Tone, and Dark Tone settings can also be changed by changing the compensation ratio. The compensated image data is output as an 8-bit signal to obtain more graduation steps. Therefore, this increases resolving power for half-tone images. The above graph shows one of the compensation ratios for input and output.



C223D630.wmf



C223D631.wmf



C223D632.wmf

A: Darker 2
B: Darker 1
C: Normal
D: Lighter

The compensation ratio varies depending on which image density and contrast are selected. For example, when Darker 1 is selected, the output value of the image data is increased slightly (i.e. it is slightly higher than the output obtained when Normal density is selected).

When Light Tone is selected, the 8-bit output concentrates on the light tone part of the image (the low input value). This helps better reproduce the lighter parts of the image and the whole image will darken a bit. On the other hand, when Darker Tone is selected, the 8-bit output concentrates on the dark tone parts of the image. This helps better reproduce the darker parts of the image and the whole image will lighten a bit.

The above graphs show the compensation ratios for each contrast and image density setting.

9.4.5 Half-tone Processing

In photo mode, the 8-bit image data from the photo data compensation processor are converted into single-bit white or black pixels in the half-tone processor. This helps reproduce half-tone images (such as photographs). For half-tone images, this process works better than the binary process.

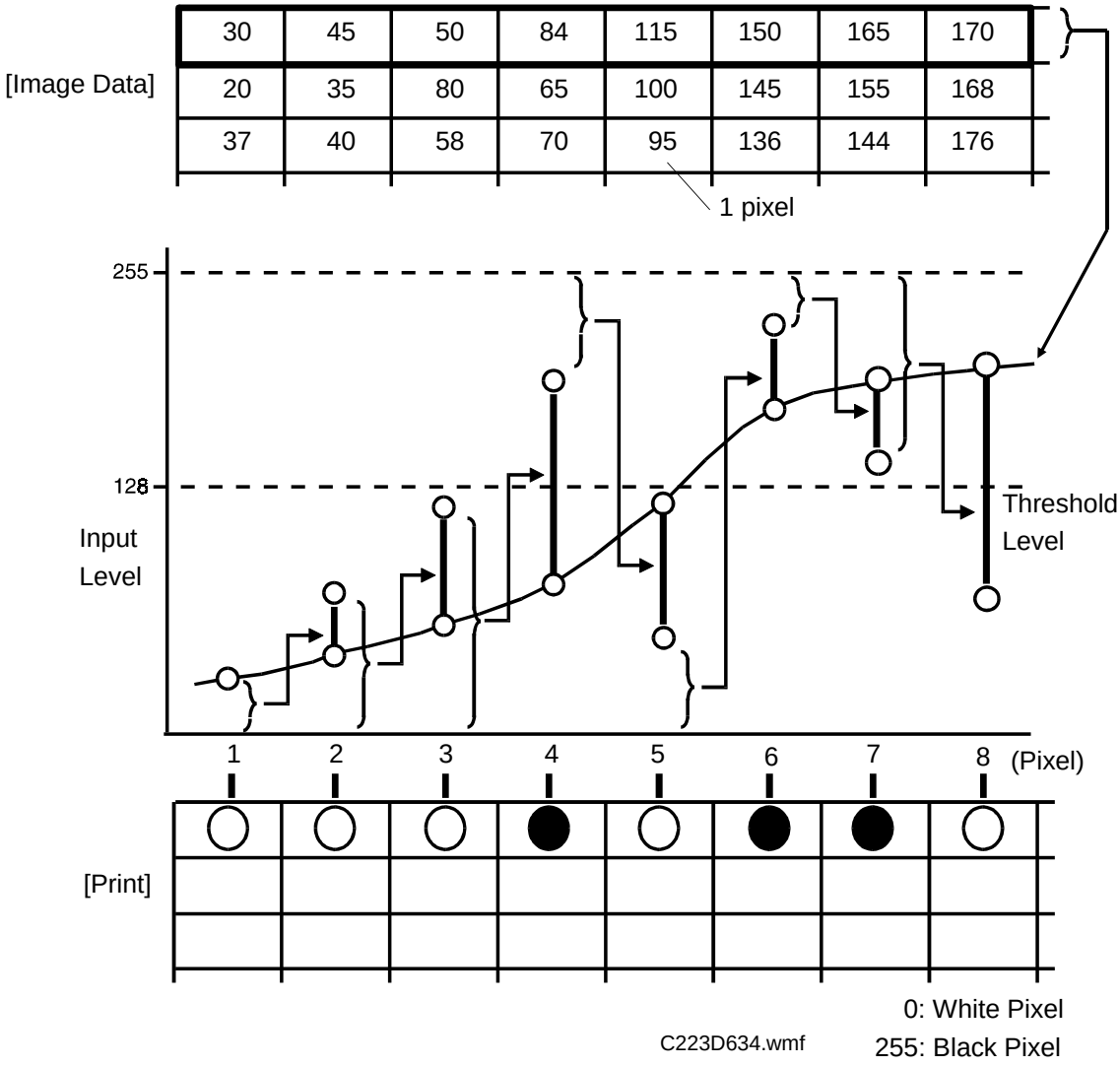
When the photo mode is selected, three types of half-tone processing can be selected with the Screen key (Normal, Fine, and Coarse). The normal type (non-screen) is selected first, when the photo mode key is is pressed.

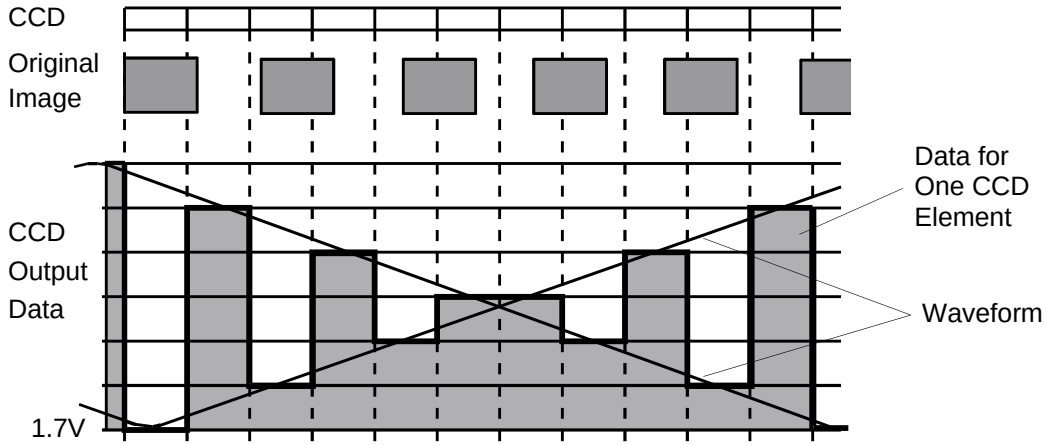
– Error Diffusion Processing –

Error Diffusion Processing is used when a screen mode is not selected (i.e., when Normal is selected).

When an image signal is converted into a single-bit (white or black) signal based on a threshold level, a difference is yielded between the image signal value and the complete white value (255 in 8-bit signal) or black value (0). With Error Diffusion Processing, the difference is distributed among the surrounding pixels. (The binary process simply erases these differences.)

For example, when considering a one dimensional Error Diffusion Processing, the image data shown in the diagram (see the next page) produces white and black data as outputs as follows.


[Image Data]
30 45 50 84 115 150 165 170
20 35 80 65 100 145 155 168
37 40 58 70 95 136 144 176
1 pixel
255
128
Input Level
Threshold Level
1 2 3 4 5 6 7 8 (Pixel)
[Print]
0: White Pixel
255: Black Pixel
C223D634.wmf

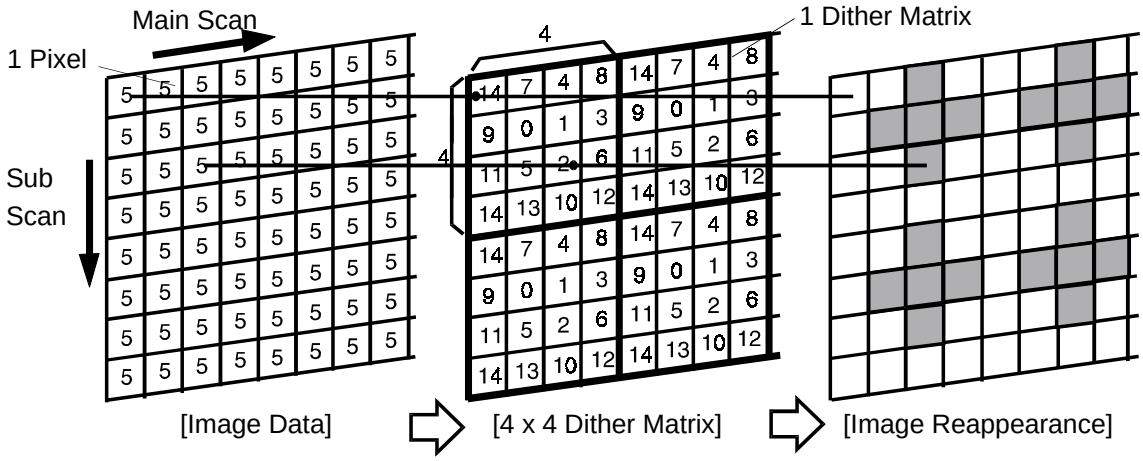


C223D635.wmf

– Moire –

When the CCD scans an image made up of regular lines such as a resolution chart, the output image may have another regular pattern over the regular lines. This is called "moire".

The above illustration shows one of the moire mechanisms. In this case, the pixel density of the CCD is the same as the density of the regular lines on the original. However, the regular lines are slightly out of step with the CCD pixels due to some magnification error when they were scanned. As a result, each CCD pixel has a different value (as shown in the above figure). Since the length of a CCD pixel is very short, the waveform from the CCD output looks like the cross lines in the figure. The moire pattern appears when prints are made from this signal. The moire pattern typically appears when the CCD pixel density is a multiple of the density of the regular lines on the original.



All pixels' values from 4-bit data are at 5. (Gray Image)

The number shows the threshold level for each pixel.

Shaded pixels show black dots.

C223D637.wmf

– Dithering –

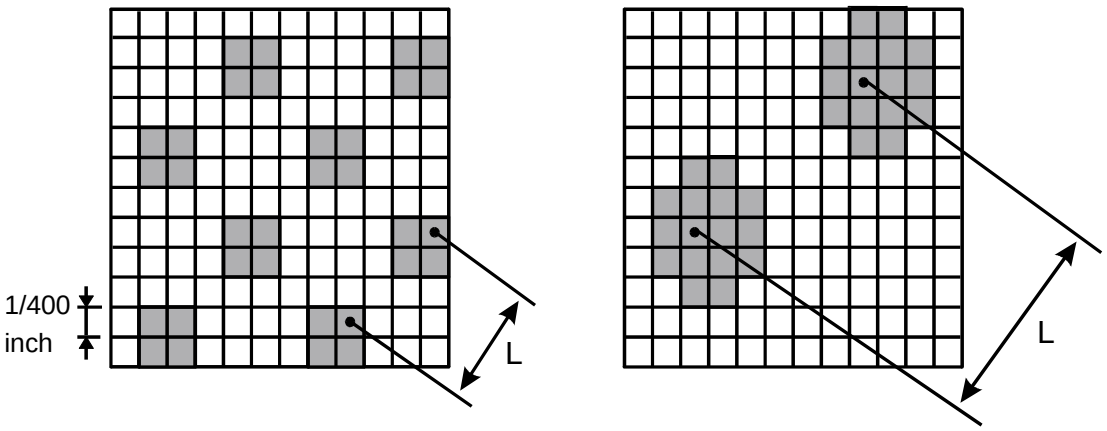
Dithering is used when the screen mode is selected in Photo mode. Two kinds of dither matrices are used for the fine and coarse screen level.

Dithering converts 8-bit image data into single-bit white or black data.

A dither matrix contains various threshold levels (Vthn) for the locations which correspond to some pixels of an original image. Each pixel datum of the scanned image (En) is compared with the corresponding fixed threshold level (Vthn) in the dither matrix. Then, each pixel datum is converted to either black or white depending on whether the image data is greater or less than the threshold level. This procedure is repeated for the whole area of the original. The thresholds of the dither matrix are determined so that half-tone graduations are introduced on prints using only black and white pixels. This is done by changing the ratio of black pixels to white pixels.

The figures above show an example of a 4 x 4 (16 pixels) dither matrix and dithering for 4-bit data scanned from an imagined gray image. The result of dithering (image reappearance) shows the pattern of white and black dots, which appears gray to the human eye.

[Fine Screen] [Coarse Screen]



C223D637.wmf

$L = \frac{1}{400} \times 3 \times \sqrt{2}$ inches
(100 Lines/inch)

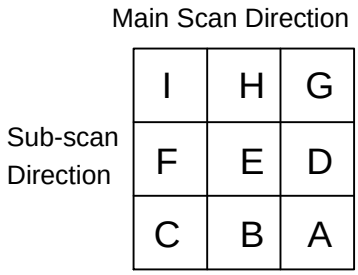
$L = \frac{1}{400} \times 6 \times \sqrt{2}$ inches
(50 Lines/inch)

In this model a 12 x 12 dither matrix is used to convert 8-bit image data into single-bit data. There are two kinds of dither matrices to allow for the fine and coarse screen modes.

A uniform gray area of an original is scanned, and the pixel datum is set at 55. It then goes through the dithering process and the results (both for coarse screen and fine screen) are shown above.

9.4.6 Line/Photo Separation

In the Line/Photo mode, the machine checks each pixel of the original to see if the pixel is in a line area or a photo area. To recognize a line area in a photo original, the CPU does the following calculation on the 6-bit pixel data.



C223D638.wmf

$X = |E–F| + |E–D|$
$Y = |E–H| + |E–B|$

In the following conditions, the machine recognizes that pixel E is in a line area of the image, and replaces it with the value of the same pixel calculated with the MTF process.

(F = 0 or D = 0) and (x > threshold level)
or
(H = 0 or B = 0) and (y > threshold level)

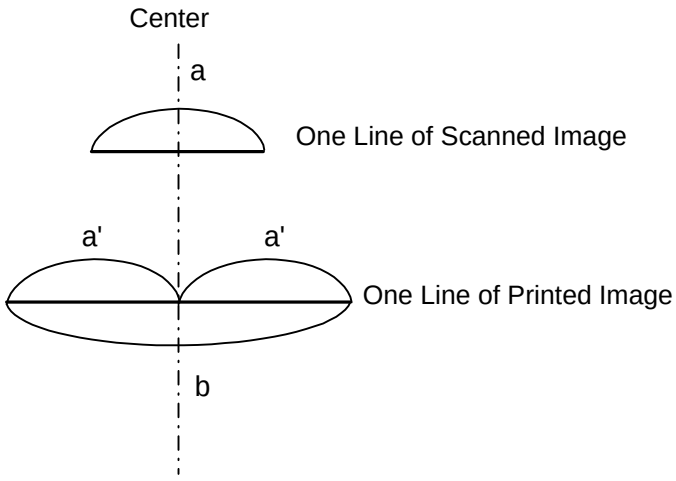
The threshold level changes depending on the image density, contrast, and the SP34 setting.

Contrast	Image Density	Threshold
Standard	Lighter	18
	Normal	16
	Darker 1	22
	Darker 2	22
Light	Lighter	16
	Normal	14
	Darker 1	14
	Darker 2	14
Dark	Lighter	8
	Normal	10
	Darker 1	14
	Darker 2	14

(When "0" is selected with SP34)

9.4.7 Multi-copy Circuit

If Quadruple copy mode is selected, one main scan line from the original is output twice to make one line of the printed image as shown below.



C223D639.wmf

The original scan width is calculated with the following formula:

$$\text{Scan Width (a)} = \frac{\text{Paper Width (b)}}{2 \times \text{Magnification Ratio}}$$

9.4.8 Shadow Detection in Platen Mode

In platen mode, to detect which part of the scanned area is the original, and which parts are shadows, the machine compares each 6-bit pixel value of scanned area with a threshold level. This is done before the MTF correction. If the data within a certain area are greater than the threshold level, and the area is not surrounded by white areas, the machine recognizes that the area is not part of the original and the area is erased.

1) Shadow Erase Threshold in Line Mode

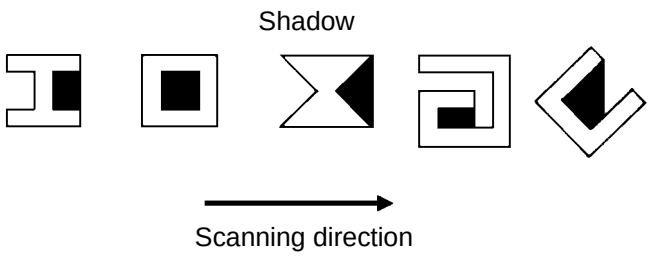
Image Density Setting	Threshold Level
Lighter	27
Normal	19
Darker 1	14
Darker 2	10

2) Shadow Erase Threshold in Photo Mode

Contrast	Image Density	Threshold Level
Normal	Lighter	23
	Normal	17
	Darker 1	11
	Darker 2	6
Light Tone	Lighter	31
	Normal	27
	Darker 1	20
	Darker 2	12
Dark Tone	Lighter	12
	Normal	9
	Darker 1	6
	Darker 2	2

Exceptions

If the shape of the originals are as shown below, the black areas cannot be recognized as shadows.



C223D596.img

9.4.9 Make-up Processing

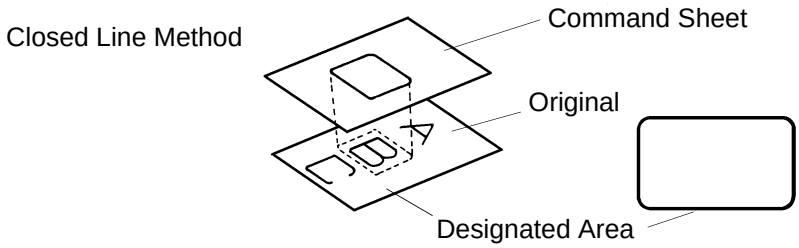
If an optional Make-up Function Board is installed, Image Make-up mode is available.

– Overall Operation –

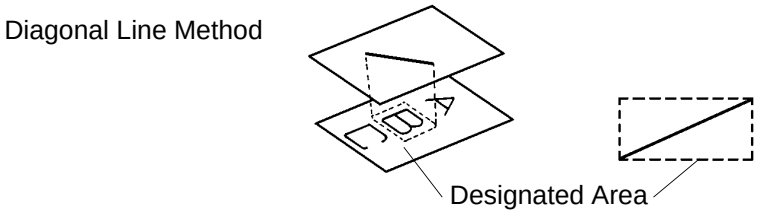
The user makes command sheets to specify how various areas of the original should be processed. The command sheets must be scanned before the original. The command sheet is scanned twice as fast as the original. The image data for the command sheet are digitized and converted to single-bit white or black data. They also go through normal image processing in the line mode. The image data for a command sheet are reduced to 1/80 and stored in the corresponding memory area.

The command sheet data are picked out of memory through the area selector when image data from an original are sent to the selection circuit. When the areas designated by two or more command sheets overlap, the data from the last command sheet are picked out from the corresponding memory by the area selector.

The image data from the original and the command sheet data are combined and edited in the selection circuit. When a pattern mode is selected, the pattern generator sends the selected background pattern(s) to the selection circuit. The image data from the original, the command sheet data, and the pattern data are combined and edited in the selection circuit as ordered.



C223D640.img



C223D641.img

– Make-up Mode –

A variety of editing functions can be selected in the make-up mode as follows:

Step 1 Make command sheet(s) to designate the areas to be edited. The diagonal line method or closed area method can be used on a command sheet to designate areas. Up to four command sheets can be used at a time to designate areas for an original. If designated areas on two or more command sheets overlap, the data from the last command sheet will apply for the overlapped portion.

Step 2 Select the appropriate command number for the designated areas using the number keys. Only one command can be selected for each command sheet (up to four sheets) from seven modes. (See the following table of modes that can be selected areas.) When two or more command sheets are used, select an appropriate mode for each command sheet.

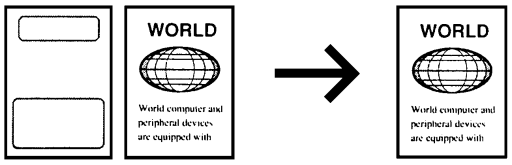
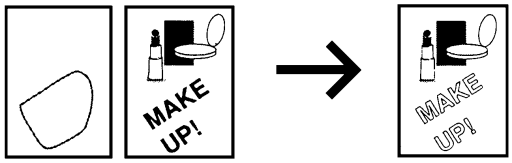
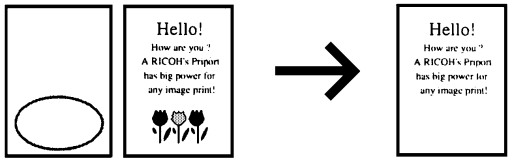
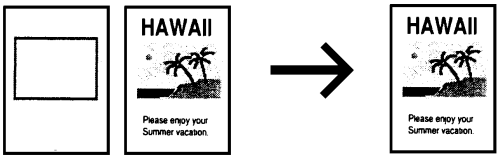
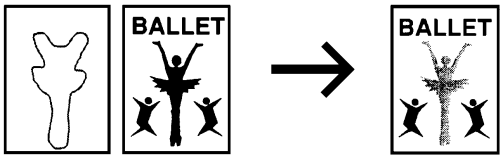
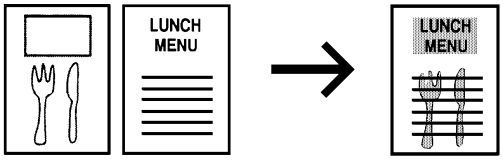
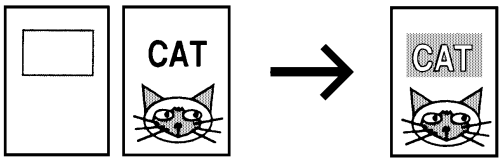
When a pattern mode is selected, also select an appropriate background pattern using the Number keys. There are 40 patterns from 1 to 40. (See the following list of background patterns.) Patterns 51 to 90 are the same as patterns 1 to 40 but the pattern elements are twice as large. By adding 100 to the pattern numbers of 1 to 40 and 51 to 90, the patterns rotate 90°. Therefore, there are 160 patterns in all.

Step 3 Select an appropriate command number for the outside of the designated areas using the number keys. Even if two or more command sheets are used at a time, only one command can be selected for all command sheets from four modes. (See the following table of modes that can be selected, for outside designated areas.)

Step 4 Set the command sheets and original in the ADF so that the command sheets are scanned prior to the original.

– Modes for Designated Areas –

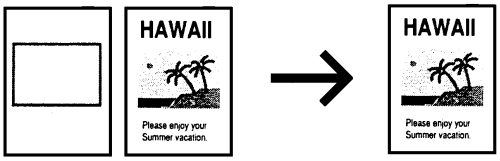
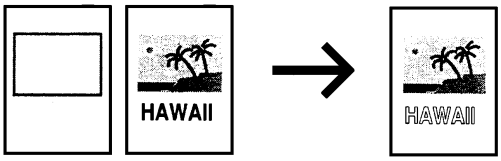
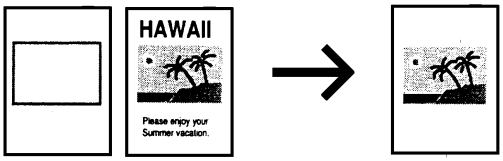
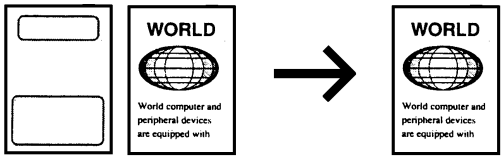
The following commands are for the designated area(s).

MODE Designated Area		SAMPLE Command sheet / Original (closed area method) → Print	COMMAND NO. Closed area method	 Diagonal line method
1.	Line mode		Fn 1	Fn 11
2.	Outline mode		Fn 2	Fn 12
3.	Delete mode		Fn 3	Fn 13
4.	Photo mode		Fn 4	Fn 14
5.	Image pattern mode		Fn 5	Fn 15
6.	Area pattern mode		Fn 6	Fn 16
7.	Image outline & Area pattern mode		Fn 7	Fn 17

C223D642.img/C223D643.img

– Modes for Outside Designated Areas –

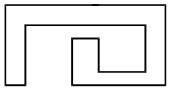
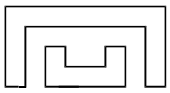
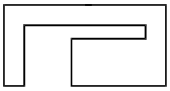
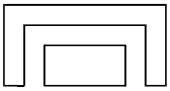
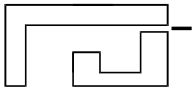
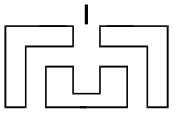
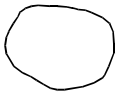
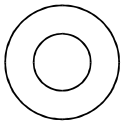
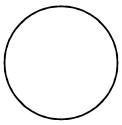
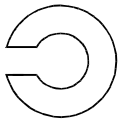
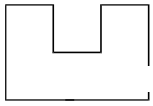
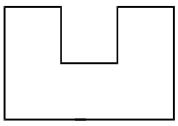
The following commands are for the area outside the designated area(s).

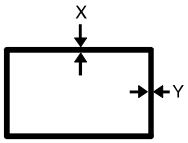
MODE Undesignated Area		SAMPLE Command sheet / Original → Print	COMMAND NO.
1.	Line mode		**Fn 1**
2.	Outline mode		**Fn 2**
3.	Delete mode		**Fn 3**
4.	Photo mode		**Fn 4**

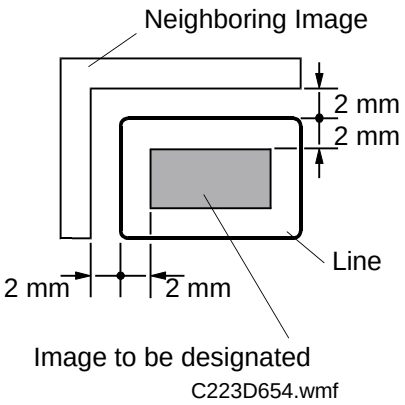
C223D644.img

– Recognition of Designated Areas –

How you enter the designated area will affect the final result. Therefore, refer to the following table when you make the command sheet.

No.	Item	Typical Problems		Preferred Designated Area
		Designated Area	Area Recognized	
1	Form of the designated area	Serial pattern   C223D645.wmf	The designated area is recognized as follows:   C223D646.wmf	Separation the area to be designated as follows:  Make a space more than 2 mm.  Make a space more than 2 mm.  Designate the area with a closed line. C223D647.wmf
		Double circle pattern.  C223D648.wmf	Only the outer circle will be recognized as follows:  C223D649.wmf	Either'. 1) Make a small gap (more than 2 mm) in the pattern.  Or'. C223D650.wmf 2) Use one command sheet for the one circle pattern. The smaller circle must be read as the designated area after the larger circle is read.
2	Non-closed line	The designated area is not a closed loop.  C223D651.wmf	The designated area is not recognized.	Designate the area with a closed loop.  C223D652.wmf

No.	Item	Typical Problems		Preferred designated area
		Designated area	**Area recognized**	
3	Thickness of the designating line	The thickness of the line must be as follows: X ≤ 1 mm Y ≤ 0.6 mm (In Full Size Mode)  C223D653.wmf	If the line of the designated area is too thin, no designated area is recognized.	Mark with a line more than 1 mm in width. (More than 2 mm for 50% reduction mode.)
4	Density of the designated line	A pencil or a color pen was used. (The line has low image density.)	If the designating line is too light, no designated area is recognized.	Mark using a black pen.
5	Type of command sheet	1) Rough paper is used as a command sheet. 2) If the command sheet has a different friction coefficient from the original.	1) Any fibrous black spots will be read as a designated area. 2) Due to different registration of the original and the command sheet, the designated areas will be different from the imagined positions.	1) Use white paper (65 g/m^2). 2) Use the same paper as the original.

No.	Item	Typical Problems		Preferred designated area
		Designated area	Area recognized	
6	Gap between the designated area and neighboring image, or gap between two designated areas.	When the gap between the designated area and the neighboring image is too small.	Depending on the original feed condition (registration and skewing) or neatness when outlining the designated area, the neighboring image may or may not be recognized as a designated area.	 C223D654.wmf 1) There should be more than 2 mm clearance between the line and the image. 2) Mark the line more than 2 mm away from the image in the designated area so that the image is recognized completely. 3) For best results, approximately 5 mm is needed between the neighboring image and the image to be designated.

9.5 MASTER MAKING

9.5.1 Thermal Head

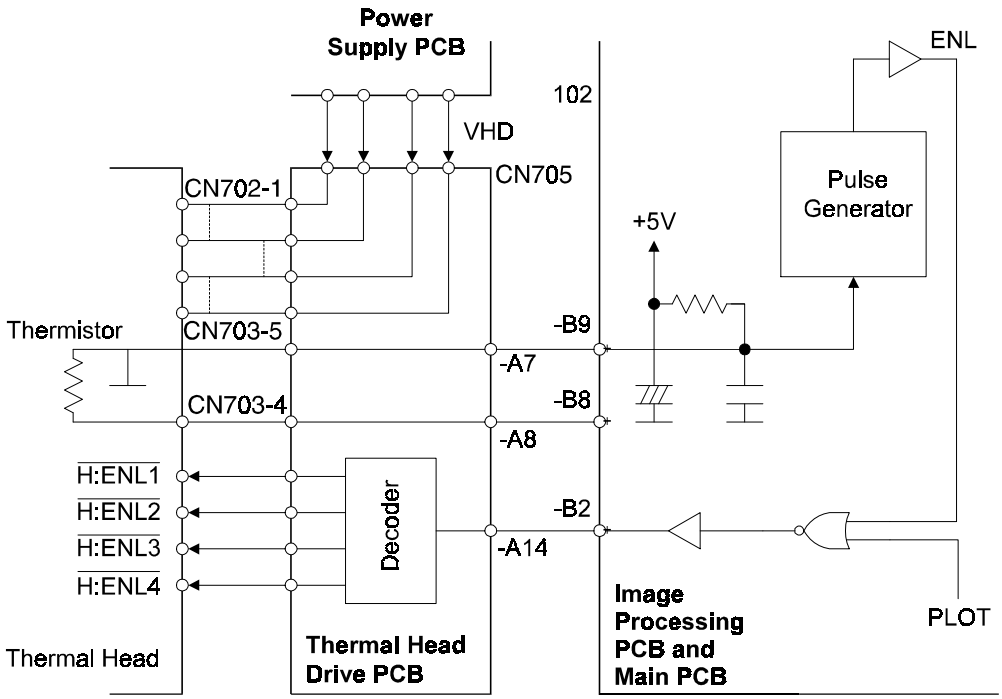
A thin-film type thermal heating element is used in the thermal head. The thermal heating elements melt the over-coating and polyester film layers of the master in response to image signals for each pixel. The specifications are as follows:

Maximum Master Making Width:292.6 mm

Number of Thermal 4608 dots
Heating Elements

Density of Thermal 400 dpi
Heating Elements

The power supply PCB applies power (VHD) to the thermal heating elements through the thermal head drive PCB. The power source (VHD) varies from one head to another since the average resistance of the elements varies. Therefore, when the thermal head or power supply PCB is replaced, it is necessary to readjust the applied voltage to the particular value indicated on each thermal head (see Replacement and Adjustment: Thermal Head Voltage Adjustment).

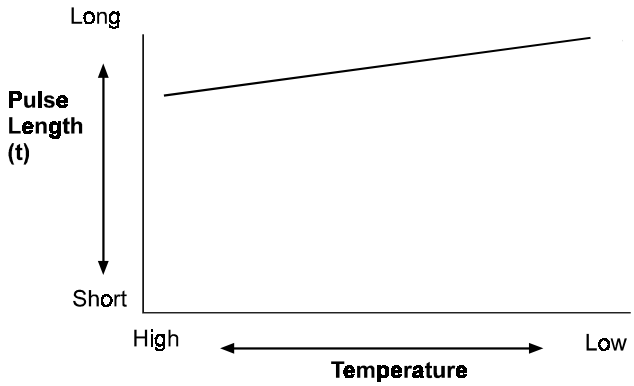


C223D597.wmf

9.5.2 Thermal Head Control

The energy applied to the thermal heating elements is determined by the length of time (t) for which power is applied.

The time depends on the thermal head temperature which is detected by the thermistor on the thermal head. If the temperature is higher, the time (t) will be shorter.



C223D598.wmf

The time (t) is determined when the Master Making key is pressed, and it is kept constant until the current master is finished.

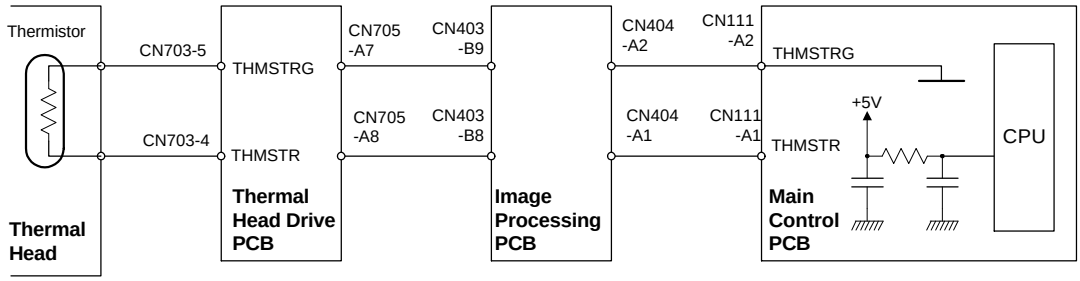
Each thermal element receives data twice to make one pixel.

C223D599.wmf

1) The 1st datum depends on whether the previous pixel was black or white. If the previous pixel was black, the 1st output for the next pixel is white. If the previous pixel was white, the 1st output for the next pixel is black. This is to counterbalance the effect of the previous heating element's condition on the next pixel.

2) The 2nd datum is the actual image datum for that pixel.

9.5.3 Thermal Head Protection



C223D655.wmf

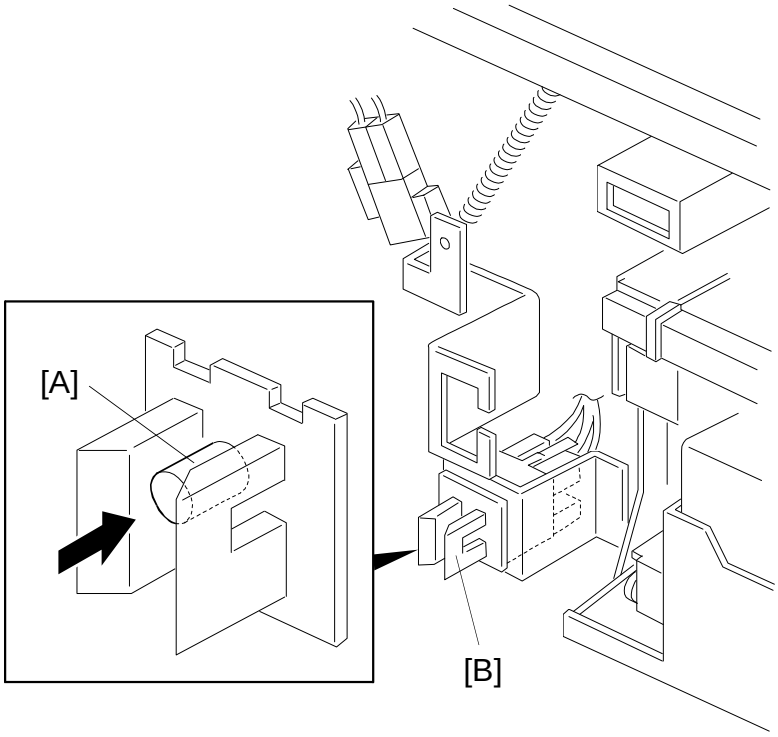
The thermistor on the thermal head and a thermal guard (a thermostat) on the PSU are used for thermal head protection. This prevents the thermal head and power supply unit from overheating when continuously processing a solid image.

The CPU detects an abnormal condition when the Master Making key is pressed, and indicates an SC code on the operation panel under the following conditions:

Detecting Component	Conditions	SC Code
Thermistor	Over 54°C (CN111-A1 is under 1.17V)	E-04
	Under –20°C (Thermistor Open)	E-09

10. OTHERS

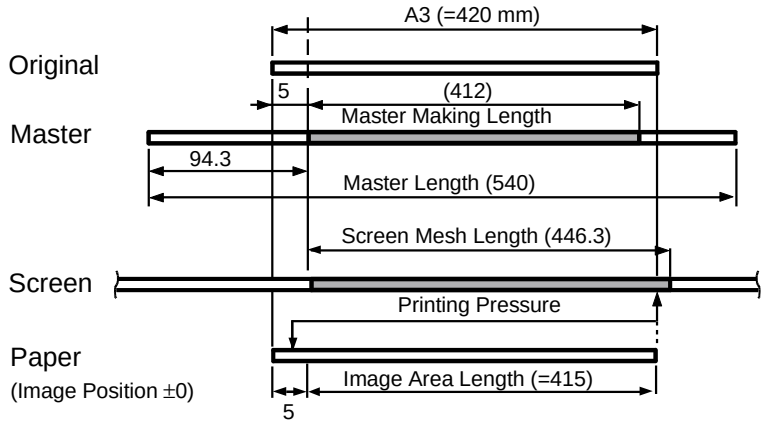
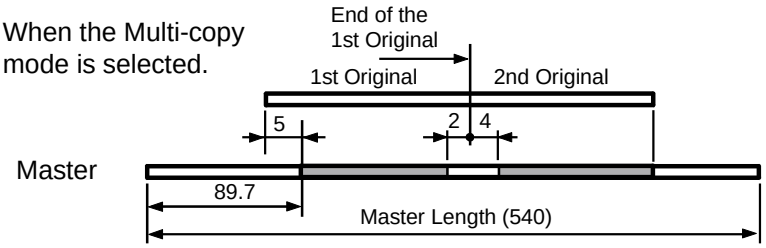
10.1 TEST SWITCH

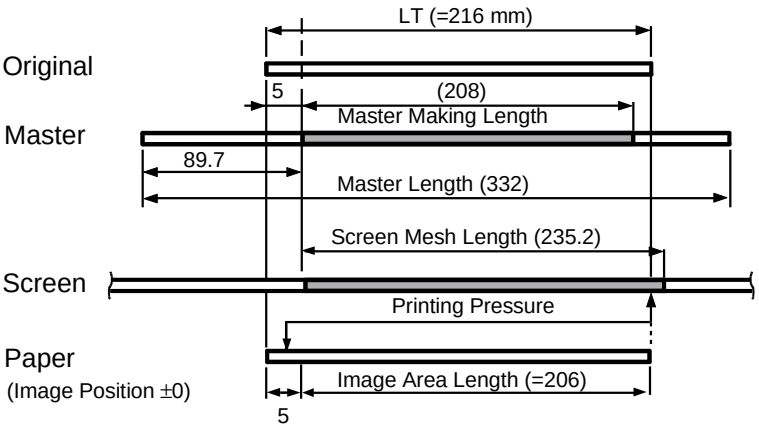
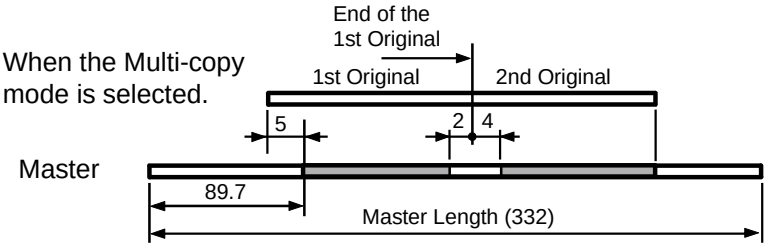


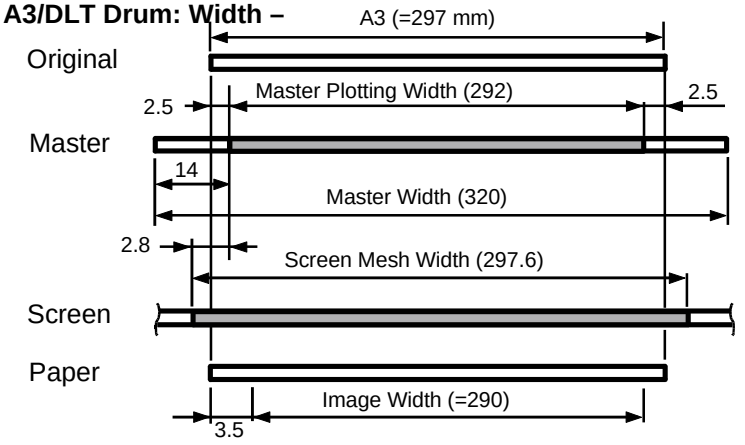
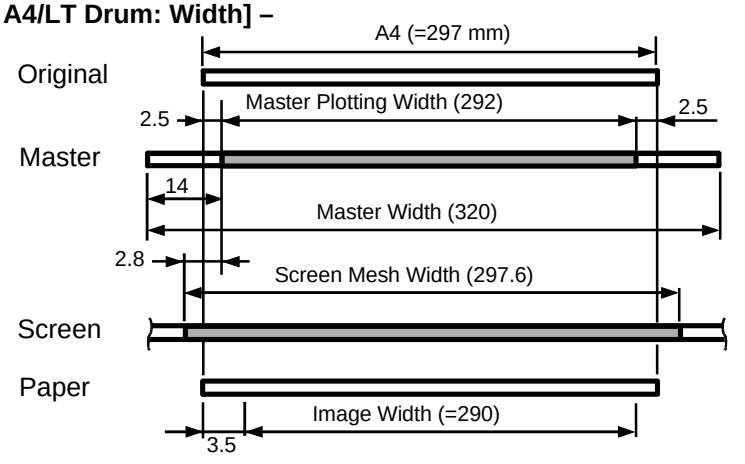
C223D671.wmf

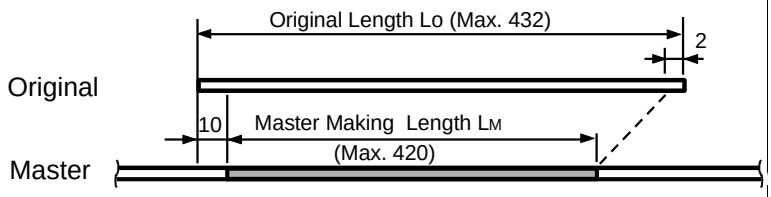
Push in the actuator [A] of the test switch [B] located inside of the inner cover to disable the front door, paper table, master eject unit, and scanner unit safety switches. The safety switches remain deactivated as long as the actuator is pushed in.

10.2 MASTER MAKING AND PRINTING AREAS

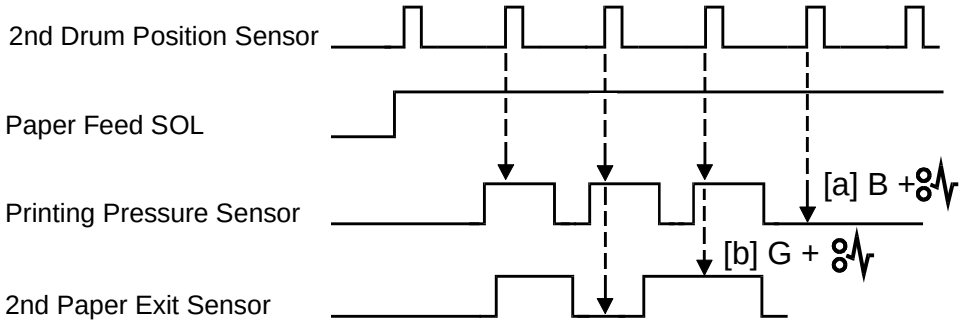
Items	Standard	Note
– A3/DLT Drum: Length –		1) Master making area changes with aper size.
	 C223D657.wmf	2) In enlarge or reduce mode, the 5 mm margin is not enlarged or reduced. 3) If the machine knows the paper size, it allows for a 3 mm blank margin at the paper's trailing edge. If paper size detection is canceled with an SP mode, the machine will not print the last 2 mm of the original on the master.
When the Multi-copy mode is selected.	 C223D568.wmf	4) In Multi-copy mode, the trailing edge of the 1st image has a 2 mm margin and the leading edge of the 2nd image has a 4 mm margin. (These margins vary with the magnification ratio.)
	Maximum Image Length: 415 mm	
	Maximum Master Making Length: 420 mm	
	Screen Mesh Length: 446.3 mm	
	Master Cut Length: 540 mm	

Items	Standard	Note
– A4/LT Drum: Length –		1) Master making area changes with paper size.
	 C223D657-2.wmf	2) In enlarge or reduce mode, the 5 mm margin is not enlarged or reduced. 3) If the machine knows the paper size, it allows for a 3 mm blank margin at the paper's trailing edge. If paper size detection is canceled with an SP mode, the machine will not print the last 2 mm of the original on the master.
When the Multi-copy mode is selected.	 C223D658-2.wmf	4) In Multi-copy mode, the trailing edge of the 1st image has a 2 mm margin and the leading edge of the 2nd image has a 4 mm margin. (These margins vary with the magnification ratio.)
	Maximum Image Length: 206 mm	
	Maximum Master Making Length: 211 mm	
	Screen Mesh Length: 235.2 mm	
	Master Cut Length: 332 mm	

Items	Standard	Note
– A3/DLT Drum: Width –	 C223D661.wmf Maximum Image Width: 290 mm Master Making Width: 292 mm Screen Mesh Width: 297.6 mm Master Width: 320 mm	In enlarge or reduce mode, the center of the image does not shift.
– A4/LT Drum: Width] –	 C223D661-2.wmf Maximum Image Width: 290 mm Master Making Width: 292 mm Screen Mesh Width: 297.6 mm Master Width: 320 mm	In enlarge or reduce mode, the center of the image does not shift.

Items	Standard	Note
– Master Making Length in Relation to Paper Size –		
	 C223D663.wmf Master Making Length $L_M = (Lo - 5 - 2) \times \frac{\alpha}{100}$ A3/DLT $L_M \leq 420$ A4/LT $L_M \leq 211$ α: Magnification Ratio (%)	The machine will not print the last 2 mm of the original on the master.

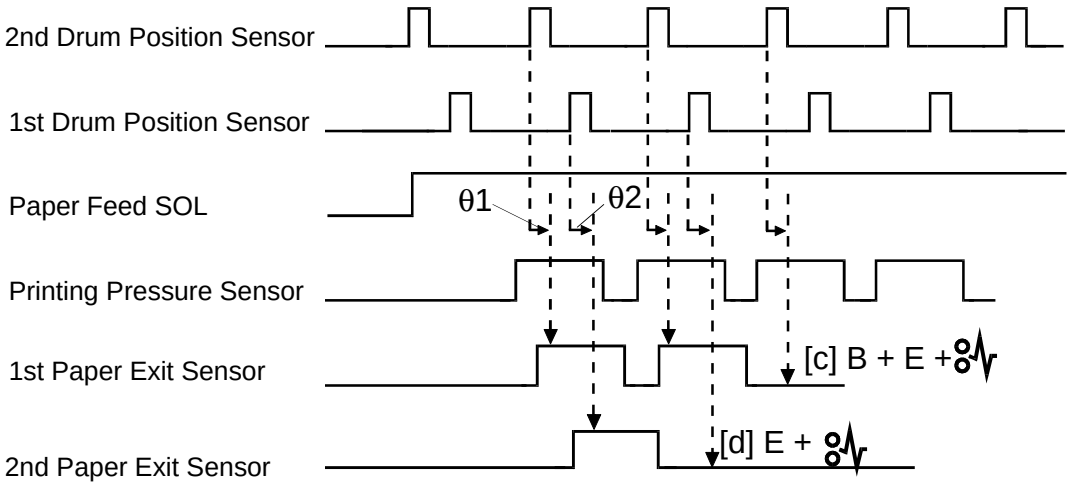
10.3 PAPER MISFEED DETECTION



C223D664.wmf

[a] When the 2nd drum position sensor turns on, if the printing pressure sensor is still OFF, the main PCB detects a paper misfeed.

[b] When the 2nd drum position sensor turns on, if the 2nd paper exit sensor remains ON, the main PCB detects a paper misfeed.



C223D665.wmf

[c] When the drum has rotated 20° (θ1)after activating the 2nd drum position sensor, if the 1st paper exit sensor is still OFF, the main PCB detects a paper misfeed.

[d] When the drum has rotated 25° (θ2) after activating the 1st drum position sensor, if the 2nd paper exit sensor is still OFF, the main PCB detects a paper misfeed.

11. COMBINATION CHART

This combination chart shows which modes can be used together.

❍: means that these modes can be used together.

✗: means that these modes cannot be used together.

★: means that some functions in these modes cannot be used together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Reduction		✗	✗	❍	❍	❍	✗	❍	❍	❍	❍	❍	✗	❍	❍	❍
2	Enlargement	✗		✗	❍	❍	❍	✗	❍	❍	❍	❍	❍	✗	❍	❍	❍
3	Zoom	✗	✗		❍	❍	❍	✗	❍	❍	❍	❍	❍	✗	❍	❍	❍
4	Auto Cycle	❍	❍	❍		❍	❍	❍	❍	❍	❍	❍	❍	★	★	❍	❍
5	Memory/Class	❍	❍	❍	❍		❍	❍	❍	❍	❍	❍	❍	❍	❍	★	❍
6	Multi Copy	❍	❍	❍	❍	❍		❍	❍	❍	❍	❍	❍	✗	✗	❍	❍
7	Directional Mag.	✗	✗	✗	❍	❍	❍		❍	❍	❍	❍	❍	✗	❍	❍	❍
8	Margin Erase	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍	❍	✗	❍	❍	❍
9	Make-ip	❍	❍	❍	❍	❍	❍	❍	❍		✗	❍	❍	✗	❍	❍	❍
10	Line/Photo	❍	❍	❍	❍	❍	❍	❍	❍	✗		✗	❍	✗	❍	❍	❍
11	Line or Photo	❍	❍	❍	❍	❍	❍	❍	❍	❍	✗		❍	✗	❍	❍	❍
12	Image Density	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍		✗	❍	❍	❍
13	On-Line	✗	✗	✗	❍	★	✗	✗	✗	✗	✗	✗	✗		❍	❍	❍
14	Overlay	❍	❍	❍	❍	★	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍
15	Sort	❍	❍	❍	❍	★	❍	❍	❍	❍	❍	❍	❍	❍	❍		❍
16	Economy	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	

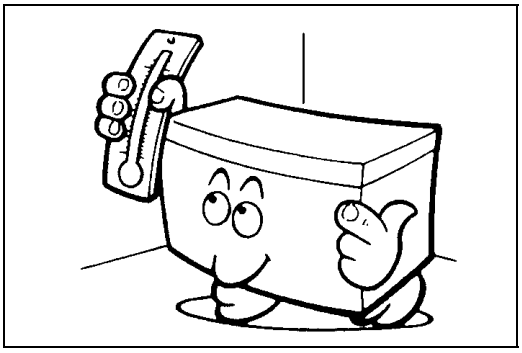
SECTION 3

INSTALLATION PROCEDURE

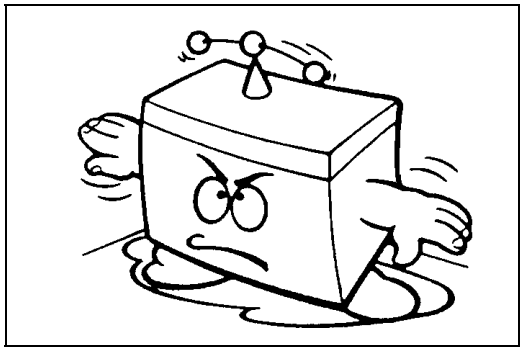
1. INSTALLATION REQUIREMENTS

The installation location should be carefully chosen because the environmental conditions greatly affect the performance of the machine.

1.1 OPTIMUM ENVIRONMENTAL CONDITIONS



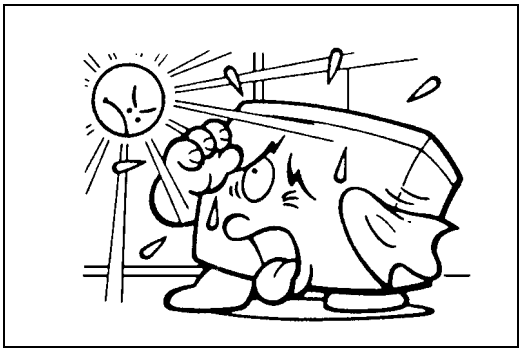
C223I518.img



C223I519.img

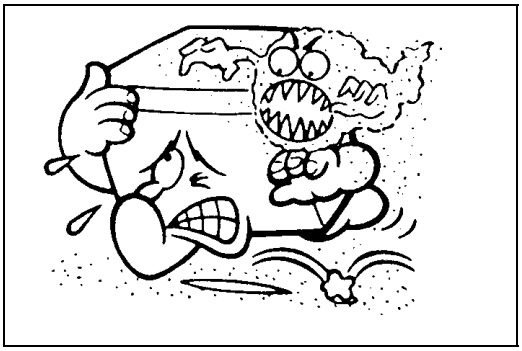
Temperature —	10 to 30°C (50 to 86°F)	On a strong and level base.
Humidity —	20 to 90 % RH	The machine must be level within 5 mm (13/64") both front to rear and left to right.

1.2 ENVIRONMENTS TO AVOID



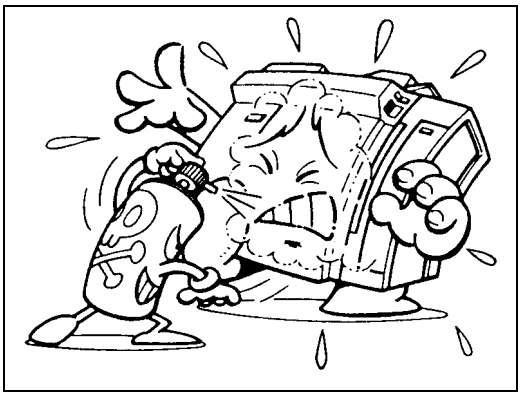
C223I520.img

Locations exposed to direct sunlight or strong light (more than 1,500 lux).



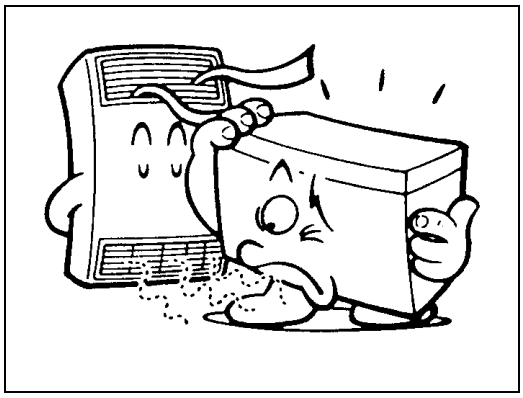
C223I521.img

Dusty areas.



C223I523.img

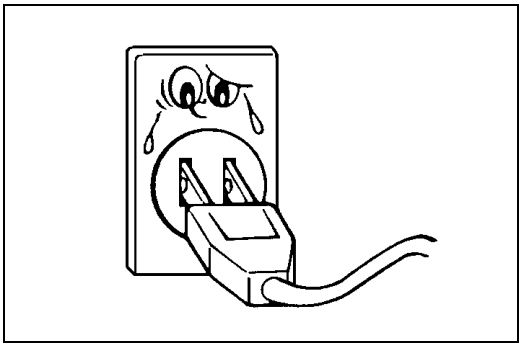
Areas with corrosive gases.



C223I525.img

Locations directly exposed to cool air from an air conditioner or reflected heat from a space heater. (Sudden temperature changes from low to high or vice versa may cause condensation within the machine.)

1.3 POWER CONNECTION

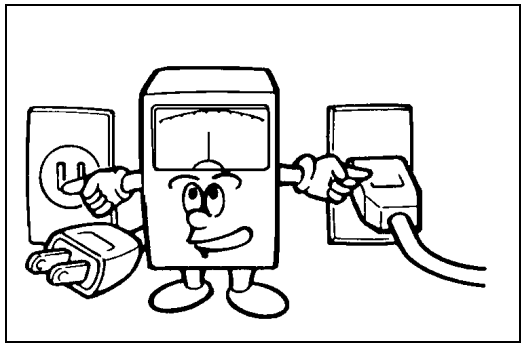


C223I524.img

Securely connect the power cord to a power source.

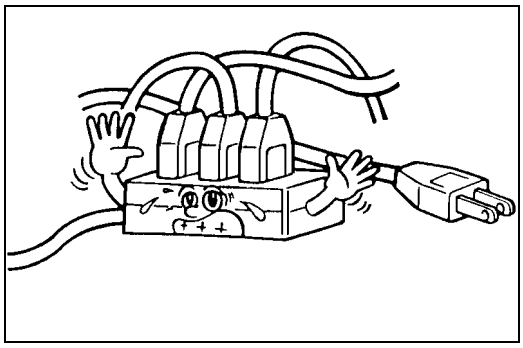
Make sure that the wall outlet is near the machine and easily accessible.

Make sure the plug is firmly inserted in the outlet.



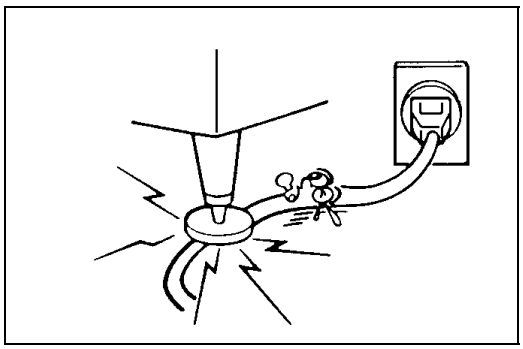
C223I516.img

Voltage must not fluctuate more than 10%.



C223I515.img

Avoid multiwiring.

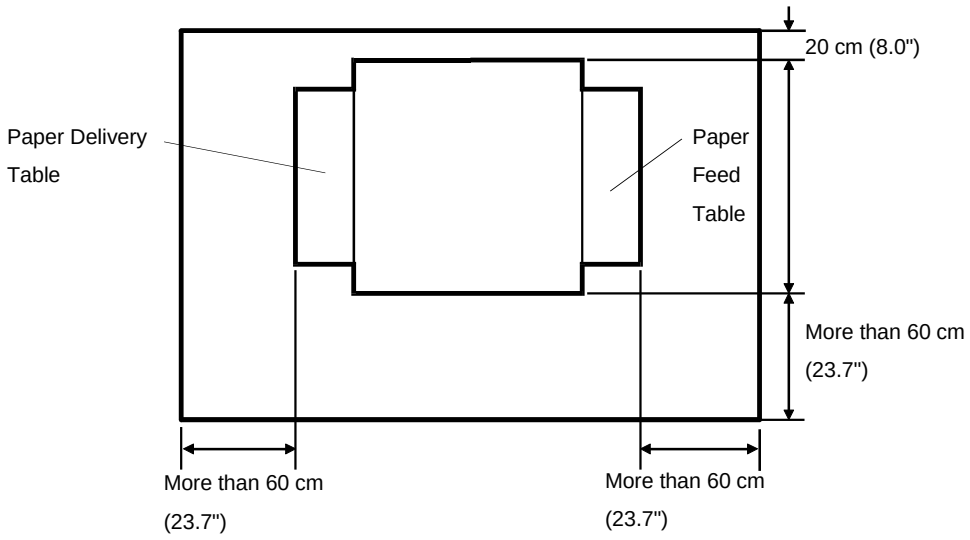


C223I517.img

Do not pinch the power cord.

1.4 ACCESS TO THE MACHINE

Place the machine near a power source, providing clearance as shown below.



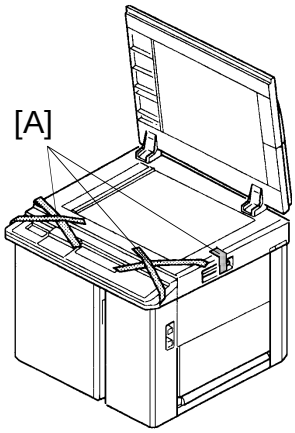
C223I526.wmf

2. ACCESSORY CHECK

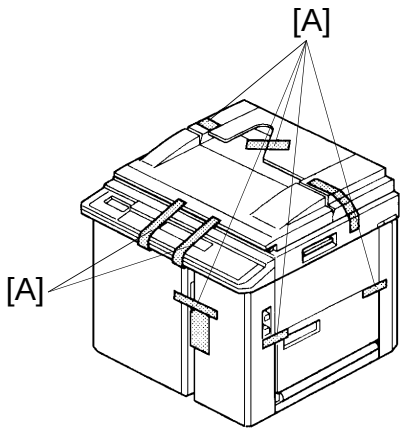
Make sure that you have the following accessories.

1. Operating Instructions (except for -27 models)
2. NECR (–17, –27, –29 models only)
3. End Plate Prop
4. Decal - Mode
5. Decal - Key Top Cover (OEM machines only)
6. Model Name Plate (OEM machines only)
7. Decal - Master Set (–27 models only)

3. INSTALLATION PROCEDURE



C223I500.img



C223I501.img

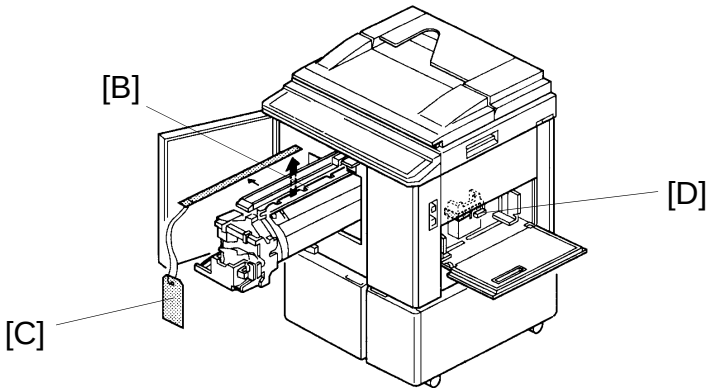
⚠CAUTION

Do not hold the scanner unit when pushing the machine or the scanner unit safety switch may be damaged.

1. Place the machine on the table.

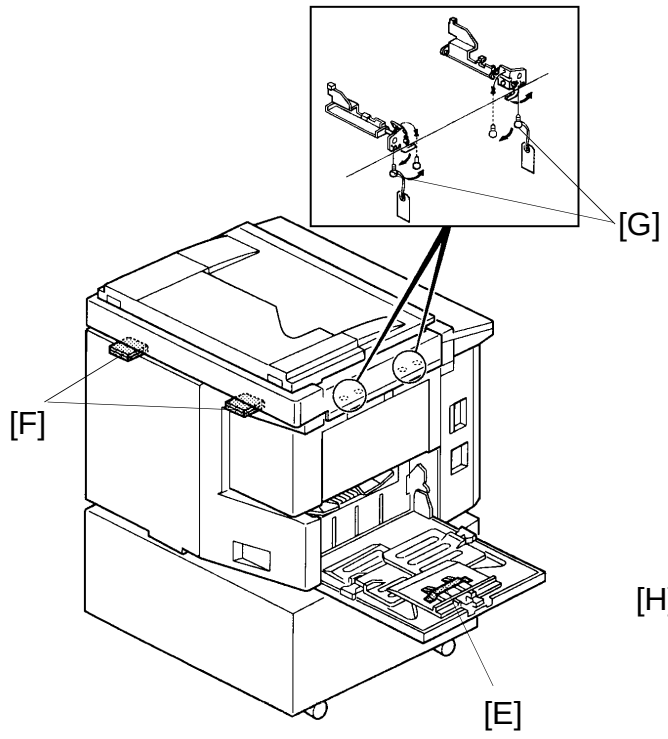
   NOTE: The screw holes in the bottom plate of the machine must line up with the screw holes in the table.

2. Remove the strips of tape [A] securing the covers and units shown above.

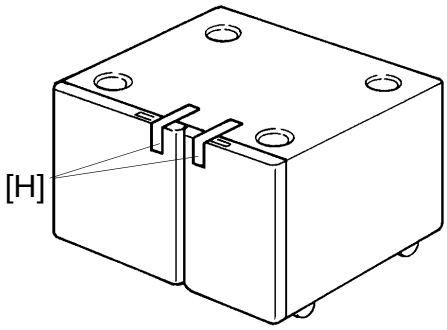


C223I502.img

3. Open the front door and slide out the drum unit [B].
4. Open the master clamper and remove the clamp [C].
5. Open the paper feed table and remove the cardboard cover [D] protecting the paper feed roller.
6. Slide the scanner unit to the left (as seen from the operation side) and remove the two strips of tape securing the master box.

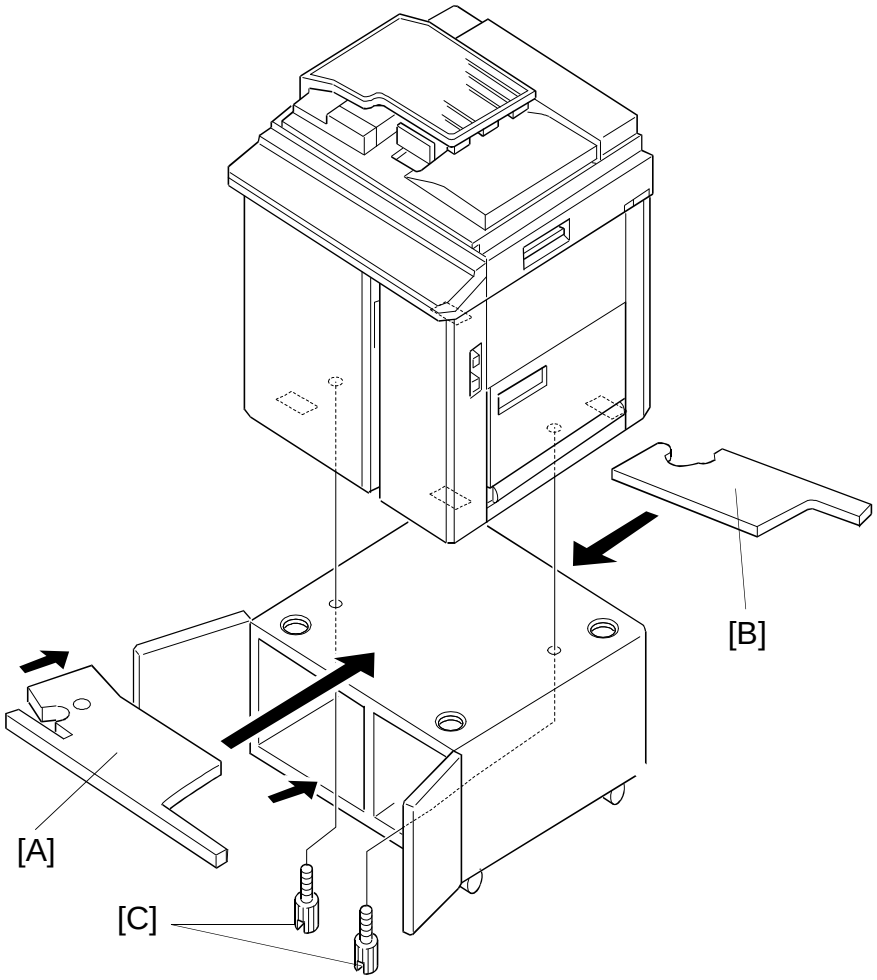


C223I503.img



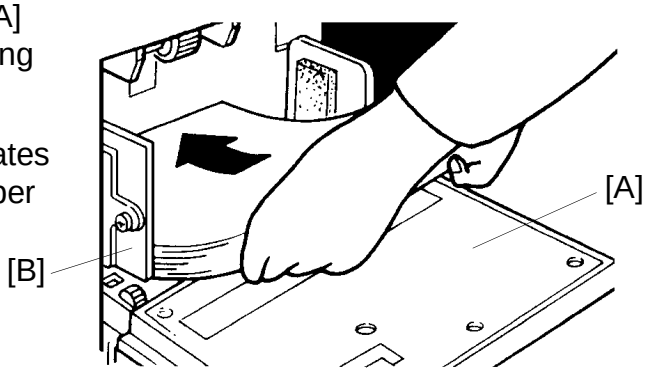
C223I504.img

7. Open the paper delivery table and remove the strip of tape [E] protecting the end fence.
8. Remove the cardboard [F] under the scanner unit.
9. Open the scanner unit and change the position of screws [G] from the transport position to the operating position.
10. Open the doors (2 strips of tape [H]) of the optional table and take out the plastic bag containing 2 screws.



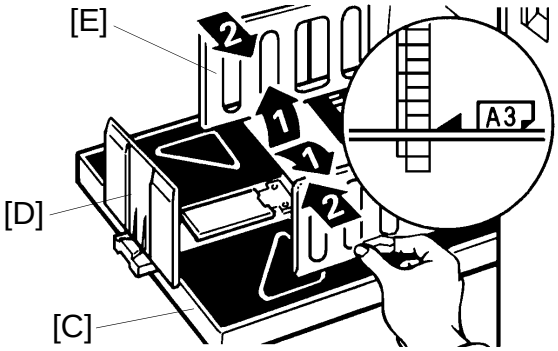
11. Raise the front side of the machine and position the base pad [A] under the machine. Then raise the rear side of the machine and position the other base pad [B] under the machine.
12. Secure the machine to the table with the two screws [C] packed with the table.

13. Open the paper feed table [A] and neatly stack some printing paper on the table.
14. Slide the paper feed side plates [B] gently up against the paper stack.



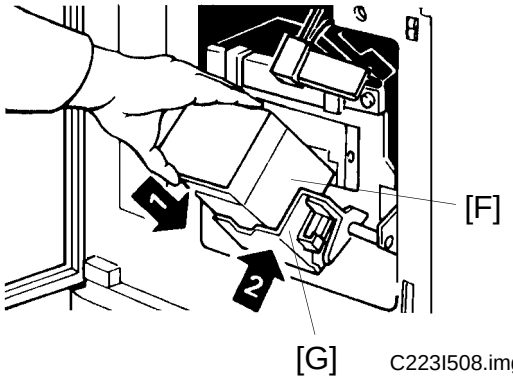
C223I506.img

15. Open the paper delivery table [C] and adjust the position of the end plate [D] and the side plates [E] to match the printing paper size. Refer to the paper size scale on the table.



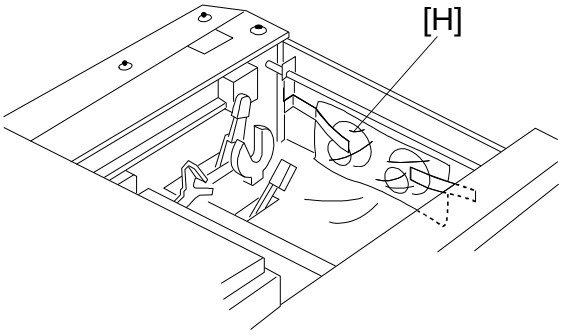
C223I507.img

16. Install the ink cartridge [F].
    a. Open the front door and lower the ink holder [G].
    b. Remove the ink cartridge cap.
    c. Insert the ink cartridge in the ink holder and raise the ink holder to the original position.
    d. Close the front door.



C223I508.img

17. Slide the scanner unit all the way to the left, and take the master spools [H] out.



C223I514.wmf

18. Install the master roll.

a. Attach a spool [A] to each end of the master roll [B].

b. Push the pressure release lever [C] to the left.

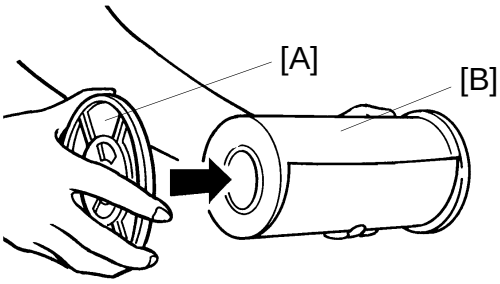
c. Set the master roll in the machine as shown in the illustration.

d. Insert the leading edge of the master roll under the platen roller.

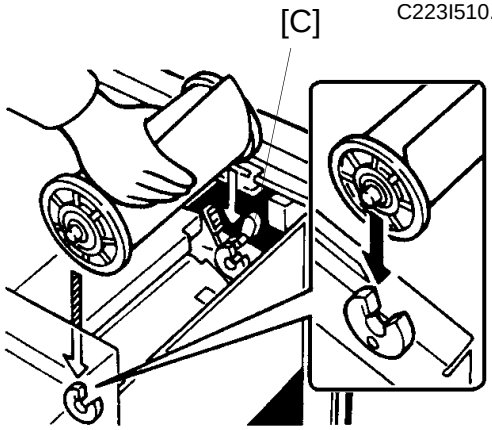
e. Return the pressure release lever to the original position.

f. Plug in the power cord and turn on the main switch.

g. Press the master cut button.



C223I510.img

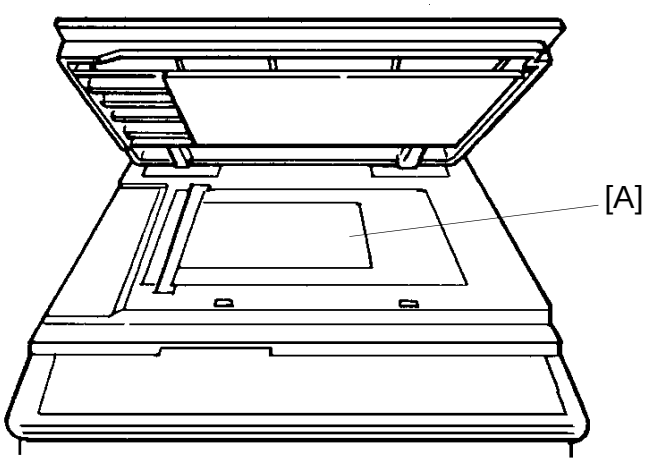


C223I511.img

h. Open the master box cover and remove the cut strip of master paper.

NOTE: Confirm that the paper on the master roll is not bent or creased.

i. Close the scanner unit.



C223I512.img

19. Idle the machine to distribute ink on the drum.

    a. Press the Reset key while holding down the "0" key on the operation panel.

    b. If blinks on the operation panel when the machine stops, press the Reset key again.

20. Make some test prints to check the machine.

    a. Raise the platen cover and place an original face down on the exposure glass [A]. Make sure the original is flush with the left scale and aligned with the proper paper size marks.

    b. Press the Master Making key.

    c. Select the lowest print speed (1) with the Speed key and press the Print Start key. Make prints at this speed until the print image density stabilizes.

NOTE: 1. Usually, about 30 prints need to be made before the image fully stabilizes.

2. Check the image quality after the print image density is stabilized.

21. If necessary, change the language for the LCD guidance as follows:

    a. Turn the main switch off and unplug the machine.

    b. Remove the right front cover (4 screws).

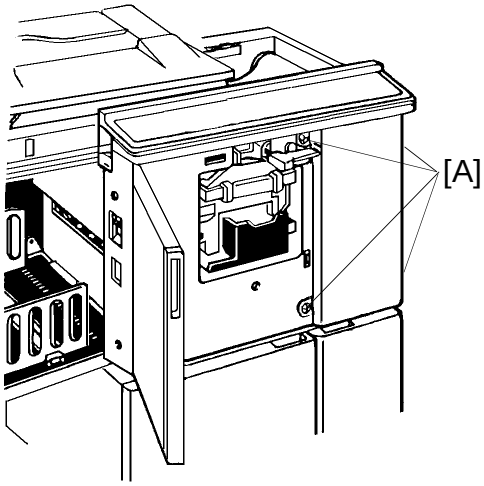
    c. Change the DIP-SW 102-1, 2, 3 settings. The following table shows the setting for each language.

DPS102			LCD Display
1	**2**	**3**	
ON	ON	OFF	English (Default)
OFF	OFF	ON	German
ON	OFF	ON	French
OFF	ON	ON	Spanish
ON	ON	ON	Italian

    d. Reinstall the right front cover (4 screws).

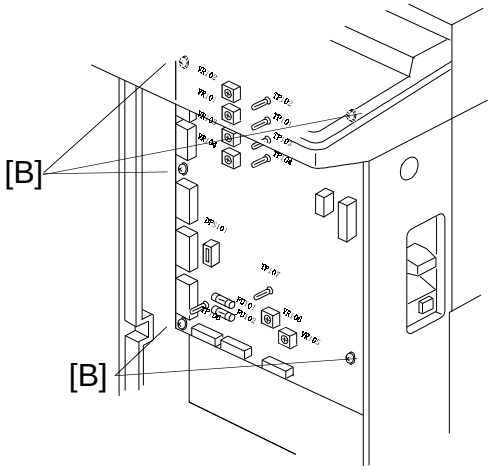
4. MAKE-UP FUNCTION BOARD INSTALLATION PROCEDURE (OPTION)

1. Turn off the main switch and unplug the power cord.
2. Remove the right front cover (4 screws [A]).
3. Disconnect all the connectors on the main PCB.



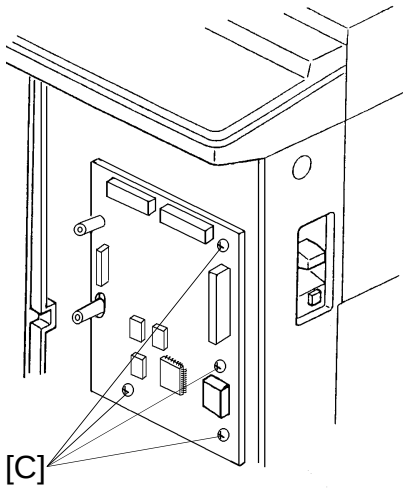
C569I300.img

4. Remove the main PCB (5 screws [B]) and Main Board Spacers.



C569I501.img

5. Replace the Image Processing PCB with the optional Make-up Function board (4 screws [C]).
6. Reinstall the Main PCB and right front cover.
7. Plug in the power cord and turn on the machine. Make some test prints using the Image Make-up function.



C569I302.wmf

SECTION 4

SERVICE TABLES

1. SERVICE REMARKS

1. If a circuit breaker or a fuse opens, check and remove the cause of the overcurrent before resetting the breaker or replacing the fuse.
2. If the thermal head or the power supply unit is replaced, thermal head voltage adjustment is required.
3. Do not touch the edge of the cutter blade with bare hands.
4. Be careful not to drop the master eject unit when removing the eject unit guide shaft.
5. If the paper feed guide plate is removed, make sure that the guide plates do not touch the lower second feed roller when putting back the guide.
6. When putting back the lower separation roller, make sure that the front and rear separation levers move smoothly.
7. If the slowest speed is faster than 60 rpm, the sorter cannot keep up with the machine and a TS sorter jam might occur.
8. Do not energize the master feed and master eject clamper solenoids for longer than 10 seconds.
9. When adjusting the ink roller gap, check the gap at the right, center, and left positions.
10. The ink detection adjustment should be made under normal conditions (20 C/65%RH).
11. When removing the pressure cam drive gear, do not loosen the two deeply recessed bolts.
12. If the main drive belt has been removed, check the relationships between the drum drive gear, printing pressure cam, and the paper feed cams after replacing the belt. Adjust if necessary.
13. Do not keep on pressing the Image Position key if the image position sensor is broken or removed. The plastic gears between the metal gears may break.

2. SERVICE TABLES

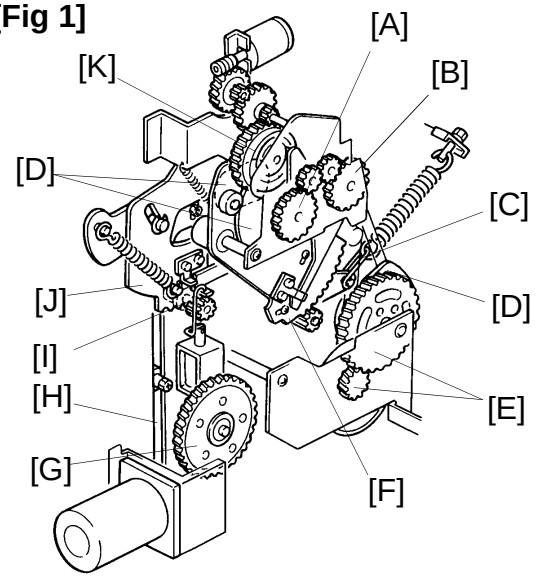
2.1 MAINTENANCE TABLES

2.1.1 Lubrication Points

Lubricate after removing adhering ink and paper dust at yearly intervals.

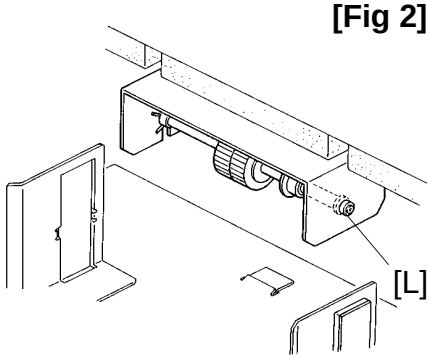
Section	Lubrication Point	Type	Location
Drive	Speed Reduction Gears of the Main Motor	Grease (Shell Albania No. 2)	(Fig.1- E)
	Gears of the Drum Drive Shaft		On the inside and outside of the frame (Fig.1- B)
Image Positioning	Spiral Track of the Cam Gear		(Fig.1- K)
Paper Feed	Paper Feed Sector Gear		(Fig.1- J)
	Second Feed Sector Gear		(Fig.1- F)
	Gear of the Paper Feed Cam Shaft		(Fig.1- A)
	Paper Table Slide Groove		Both front and rear (Fig.1- H)
	Paper Table Drive Gear		(Fig.1- G)
	Bearings for the Upper Separation Roller Shaft	Motor oil (SAE No. 20)	(Fig.1- I)
	Bearings for the Paper Feed Roller Shaft		(Fig.2- L)
Drum	Drum Drive Gear	Grease (Shell Albania No. 2)	(Fig.3- N)
	Master Clamper Sector Gear		(Fig.3- O)
	Master Clamper Pinion Gear		(Fig.3- P)
	Ink Pump Drive Gear		(Fig.3- M)
Printing Pressure	Between Printing Pressure Arm [Q] and Printing Pressure Stay [Q']		Both front and rear (Fig.4- Q)
	Pressure Spring Link		(Fig.1- C)
Master Eject	Master Pressure Plate Grooves	Grease (Shell Albania No. 2)	Both front and rear (Fig.5- S)
	Rounded Ends of the Master Pressure Plate Drive Arms		(Fig.5- R)
Paper Exit	Air Pump Drive Gears		(Fig. 6-T)
	Inside of the Air Pump Piston	Grease (Mobil Ep-1)	(Fig. 6-U)
ADF	Bearings for the Feed Roller Shaft	Motor oil (SAE No. 20)	Both front and rear (Fig. 7-V)
Others	Edge of Each Cam	Grease (Shell Albania No. 2)	(Fig.1- D)

[Fig 1]



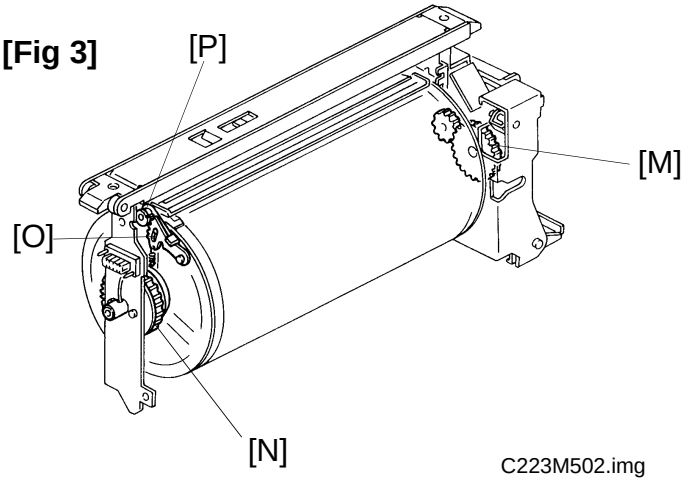
C223M500.img

[Fig 2]



C223M501.img

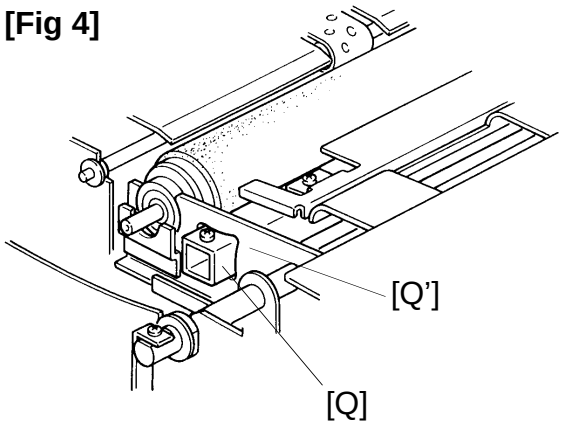
[Fig 3]



C223M502.img

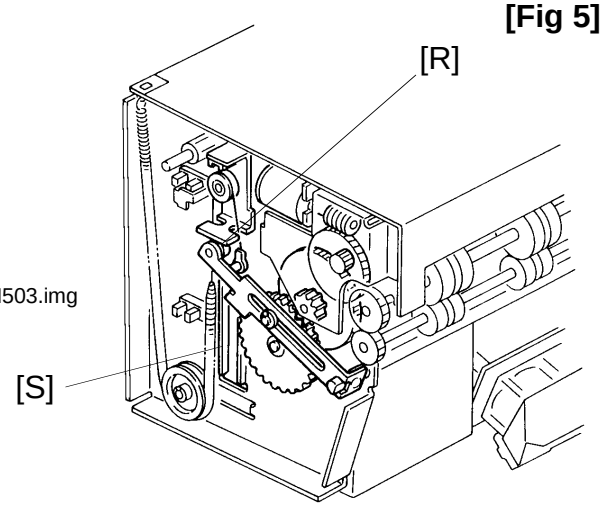
Service Tables

[Fig 4]



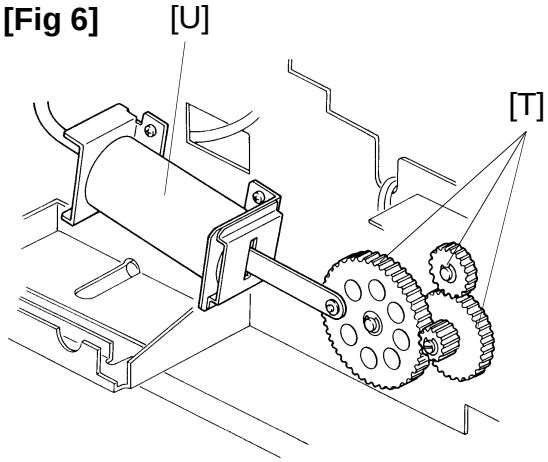
C223M503.img

[Fig 5]



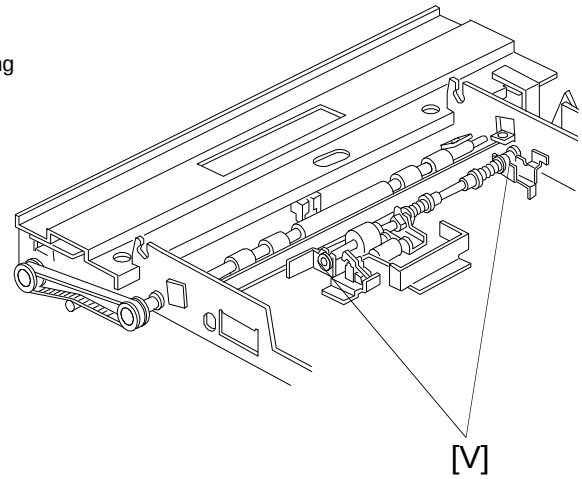
C223M504.img

[Fig 6]



C223M509.img

[Fig 7]



C223M510.wmf

2.1.2 User's Maintenance

Advise the customer to clean each item regularly. Clean the following items at every EM call if necessary.

Section	Cleaning Point	Cleaner	Interval
Optics	Original Platen Cover	Cloth and water	At every EM call
	Exposure Glass	Cloth and glass cleaner	
Paper Feed	Paper Feed Roller	Cloth and soap and water	
	Paper End Sensor	Dry cloth	
	Paper Length Sensor		
Printing	Press Roller	Cloth and soap and water	
ADF	Original Feed Rollers		

2.1.3 Periodic Inspection (every 6 months)

Section	Item	Standard Procedure
Optics	Original Platen Cover	Wipe off stains using a soft cloth moistened with ethyl alcohol.
	Exposure Glass	Wipe with a dry cloth.
Paper Feed	Paper Feed Roller	Wipe off ink and paper powder using a cloth moistened with ethyl alcohol.
	Upper and Lower Second Feed Rollers	
	Upper and Lower Separation Rollers	
Printing	Press Roller	
ADF	Pick-up Roller Feed Roller Separation Roller	Wipe off paper powder using a cloth moistened with water.

2.1.4 Periodic Inspection (every 12 months)

Section	Item	Standard Procedure
Optics	Back side of the Exposure Glass	Wipe with a dry cloth.
	Mirrors	Use a blower brush.
	Xenon Lamps	Wipe with a dry cloth.
Master Eject	Upper and Lower Master Eject Rollers	Wipe off ink and paper powder using a cloth moistened with ethyl alcohol.
	Master Eject Box	Wipe off ink using a cloth moistened with ethyl alcohol.
Drum	Inside and outside of the Drum	Wipe off built-up ink and paper powder using a cloth moistened with ethyl alcohol.
	Ink Holder	
Master Making	Platen Roller	Wipe off paper powder using a cloth moistened with water.
Others	First and Second Paper Exit Sensors Master Eject Sensor Drum Master Sensor	Check the performance of all the sensors. Remove stains from the sensors using a dry cloth.

2.2 SERVICE CALL CODES

Code	Problem	Possible Causes
Main Body		
E-01	Neither the right nor the left cutter switch turns off within 3 seconds of the cutter motor starting.	1) Drive wire cut 2) Drive section malfunction 3) Defective cutter switch
E-02	Malfunction in the paper table drive section. 1. The paper table lower limit sensor or paper table height sensor does not turn on within 7 seconds. 2. The LCT tray drive motor does not stop within 25 seconds. 3. The upper limit sensor does not turn or within 8 seconds after the LCT cassette bottom plate drive motor starts.	1) Drive worm gear broken 2) Mounting screw of the worm gear broken 3) No power supply
E-04	The temperature of the thermal head is greater than 54°C when the Master Making key is pressed.	1) Excessive thermal head temperature 2) Thermistor short
E-05	Malfunction in the image shifting section.	1) Image position sensor connector disconnected 2) Defective image position sensor
E-06	The drum rotation sensor detects an incorrect motor speed.	1) Drum lock 2) No power supply
E-09	The signal level between CN104-A1 and GND is over 4.9 volts.	1) The thermistor is open.
E-10	The CPU detects an abnormality in the pulse signals from the thermal head drive PCB. These pulses determine the energy to be applied to the thermal heating elements.	1) Defective thermistor 2) Related connectors are not connected (Thermal head drive PCB CN705 or CN701).
E-11	Encoder output does not change within 3 seconds of the main switch being turned on or the Clear Mode key being pressed.	1) Defective image position motor 2) No power supply

Code	Problem	Possible Causes
E-12	1. The upper or lower pressure plate sensor remains activated for more than 4 seconds after the pressure plate motor starts turning. 2. The lower pressure plate sensor is not activated within 8 seconds of the pressure plate motor starting to turn even though the upper pressure plate sensor is de-activated. 3. The upper pressure plate sensor is not activated for more than 8 seconds after the pressure plate motor starts to turn even though the lower pressure plate sensor is de-activated.	Pressure plate drive mechanism malfunction.
E-13	1. During scanner initialization: - The home position sensor remains activated for more than 4 seconds. - The home position sensor is not activated within 2 seconds. 2. The home position sensor is not activated within 7 seconds when the scanner returns after finishing making the master or scanning.	1) Defective home position sensor 2) Scanner motor lock
E-14	EMF sorter communication error.	
Sorters		
E-21	The 1st transport motor speed is abnormal.	1) Defective 1st transport motor 2) Defective 1st transport motor rotation sensor.
E-26	The 1st sorter helical wheel H.P. sensor status does not change even if the bin shift motor drive signal is applied. The bin shift motor rotation sensor status does not change even if the bin shift motor drive signal is applied.	1) Defective bin shift motor 2) Defective helical wheel H.P. sensor 3) Defective bin shift motor rotation sensor
E-27	The 1st sorter jogger bar H.P. sensor status does not change even if the jogger bar motor drive signal is applied.	1) Defective jogger bar motor 2) Defective jogger bar H.P. sensor

Code	Problem	Possible Causes
E-28	The 1st sorter staple position switch or staple unit movement switch status does not change even if the staple unit shift motor drive signal is applied.	1) Defective staple unit shift motor 2) Defective jogger bar H.P. sensor 3) Defective staple unit movement switch
E-29	The 1st transport sort mode position sensor or the 1st transport non-sort mode position sensor status does not change even if the delivery table motor drive signal is applied.	1) Defective 1st transport sort mode position sensor 2) Defective 1st transport non-sort position sensor 3) Defective delivery table motor
E-34	The 2nd transport motor rotation sensor speed is abnormal.	1) Defective 2nd transport motor 2) Defective 2nd transport motor rotation sensor
E-36	The 2nd sorter helical wheel H.P. sensor status does not change even if the bin shift motor drive signal is applied. The bin shift motor rotation sensor status does not change even if the bin shift motor drive signal is applied.	1) Defective bin shift motor 2) Defective helical wheel H.P. sensor 3) Defective bin shift motor rotation sensor
E-37	The 2nd sorter jogger bar H.P. sensor status does not change even if the jogger bar motor drive signal is applied.	1) Defective jogger bar motor 2) Defective jogger bar H.P. sensor
E-38	The 2nd sorter staple position sensor or staple unit movement sensor status does not change even if the staple unit shift motor drive signal is applied.	1) Defective staple unit shift motor 2) Defective jogger bar H.P. sensor 3) Defective staple unit movement switch

2.3 DIP SWITCHES, LEDs, VRs, TPs (ON THE MAIN CONTROL PCB)

2.3.1 DIP Switches

DIP Switch	Function	Remarks
DIP SW101	Do not use.	Must be off at all times.

DPS 102			LCD Display
1	2	3	
ON	ON	OFF	English
OFF	OFF	ON	German
ON	OFF	ON	French
OFF	ON	ON	Spanish
ON	ON	ON	Italian
OFF	OFF	OFF	For Japanese Machines
ON	OFF	OFF	
OFF	ON	OFF	

DPS 102	ON	OFF
4	DFII (Type 50) Also see SP8.	DFI
5	Print and master counters increment by two counts when the A3 drum is used (NRG setting). Also, see SP86.	Print and master counters increment by one regardless of the drum size.
6	Inch version	A4 version

NOTE: The DF setting can be changed using SP8. When the memory clear (SP60) is performed, the SP8 setting depends on the DPS102-4 setting. Later, if the SP mode is changed but not the DPS, the SP mode setting takes priority. This note also applies to DPS 102-5.

2.3.2 Photodiodes

LED	Component	Remarks
LED101	1st Paper Exit Sensor	When paper is detected, the LED lights.
LED102	Drum Master Sensor	When a master is on the drum, the LED lights.
LED103	2nd Paper Exit Sensor	When paper is detected, the LED lights.
LED104	Master Eject Sensor	When a master is under the master eject sensor, the LED lights.
LED105	Ink Detection	When ink is present, the LED lights.
LED106	Main Motor	When the main motor turns on, the LED lights.

2.3.3 VRs

VR	Function
VR101	1st Paper Exit Sensor Adjustment
VR102	Drum Master Sensor Adjustment
VR103	2nd Paper Exit Sensor Adjustment
VR104	Master Eject Sensor Adjustment
VR105	Adjustment for Drum Speed 5 (120 rpm)
VR106	Adjustment for Drum Speed 1 (60 rpm)

2.3.4 TPs

TP	Function
TP101	1st Paper Exit Sensor Voltage
TP102	Drum Master Sensor Voltage
TP103	2nd Paper Exit Sensor Voltage
TP104	Master Eject Sensor Voltage
TP105	Ink Detection Voltage
TP106	Drum Rotation Sensor Voltage
TP107	GND

2.4 EXPECTED LIFE OF PARTS

Section	Part Description	Expected Life
Scanner	Xenon Lamp	15,000 originals
Master Feed/Master Making	Thermal Head	30,000 masters
	Reverse Roller	30,000 masters
	Platen Roller	30,000 masters
	Upper Master Feed Roller	1 year or 30,000 masters
Drum	Drum Cloth Screen	2 years or 1,200,000 prints
Paper Feed	Paper Feed Rubber Side Plate	2 years or 1,200,000 prints
	Paper Feed Roller	6 months or 300,000 prints
	Upper Separation Roller	1 year or 600,000 prints
	Lower Separation Roller	2,000,000 prints
	2nd Feed Roller Brake Belt	1,000,000 prints
	2nd Feed Roller Gear	1,000,000 prints
	Separation Plate	1 year or 600,000 prints
Printing	Press Roller	2 years or 1,200,000 prints
Delivery	Transport Belt	2 years or 1,200,000 prints

2.5 SPECIAL TOOLS

Description	Part Number
Test Chart R-21	99992131
Resolution Chart	A0129110
Drum Gauge	C2009001
Image Shifting Gauge	C2009002

3. SERVICE PROGRAM MODE

3.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, or change adjustment values.

3.1.1 Service Program Mode Access Procedure (for engineers)

All service program modes can be accessed with this procedure.

1. Press the following keys on the operation panel in the following order:
   Case 1:
   a) Clear Modes key
   b) Clear key
   c) Combine 2 Originals key
   d) Enter key

   Case 2:
   a) Turn off the power switch
   b) Press the Enter key, Stop key, and Clear key simultaneously
   c) Turn on the power
2. The following is displayed on the LCD when the SP mode is accessed.

   ```
   SP–MODE
     PROGRAM No.      0
   ```

3. Using the number keys, enter the desired SP mode number (listed in the service program table.)

   NOTE: The SP mode number can be shifted up or down by pressing the Zoom key ("+" or "–").

4. To cancel the SP mode, press the Clear Modes key.

3.1.2 Service Program Mode Access Procedure (for users)

This procedure allows users to access only the service program modes that are marked with an asterisk in the service program table.

1. Press the following keys on the operation panel in the following order:
   a) Clear Modes key
   b) Clear key
   c) Enter key
2. The following is displayed on the LCD when the SP mode is accessed.

```
SP–MODE
 PROGRAM No.      0
```

3. Using the number keys, enter the desired SP mode number (listed in the service program table).
4. To cancel the SP mode, press the Clear Modes key.

3.1.3 Change Adjustment Values or Modes

1. After entering the desired SP mode number, press the Enter key. The current value or mode will be displayed on the LCD (at the end of the second line).
2. Enter the desired value or mode using the number keys (listed in the service program table).
   Use the Memory/Class key to toggle between + and –.
3. Press the Enter key to store the desired value or mode.
4. To cancel the SP mode, press the Clear Modes key.

3.2 SERVICE PROGRAM TABLE

*: Accessible by a customer **: Can be registered in CS mode
♥: A4 version ♦: LT version

No.	Display	Function	Data	Factory Setting	Comments
1	On line	Enables On Line key operation.	0: No 1: Yes	0	
2	FDC Type 10	Used only in Japan	0: No 1: Yes	0	Keep at 0.
3	Key Counter	Enables key counter operation.	0: No 1: Yes	0	
4	Key Card	Used only in Japan.	0: No 1: Yes	0	
5	EMF Sorter	Selects the number of sorters.	0: No sorters 1, 2, 3, 4, or 5: Sorters present	0	Input 1 to 5 to indicate the number of sorters.
7-1	DS/TS Sorter	Enables TS20A/B operation.	0: No 1: Yes	0	If "1" is selected in 7-1, the machine goes to Auto Reset Time setting mode.
7-2	Auto Reset Time	Specifies the auto reset time.	0: No 1-5: min.	0	
8	ADF Select	Informs the machine if DF Unit Type 50 is installed.	0: DF1 (or no DF) 1: DF2 (type 50)	0	
*10.	Min. Print	Limits the minimum print quantity that can be entered.	0 to 9999	0	
*11	Max. Print	Limits the maximum print quantity that can be entered.	0 to 9999	9999	
*12	♥: A4 → A3 Mag. Ratio ♦: HLT → LG Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A4 to A3 ♦: From 5 1/2" x 8 1/2" to 8 1/2" x 14"	50 to 200%	♥: 141% ♦: 155%	
*13	♥: A4 → B4 Mag. Ratio ♦: LT → DLT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A4 to B4 ♦: From 5 1/2" x 8 1/2" to 11" x 17"	50 to 200%	♥: 122% ♦: 129%	

Service Tables

No.	Display	Function	Data	Factory Setting	Comments
*14	♥: B4 → A3 Mag. Ratio ♦: LG → DLT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From B4 to A3 ♦: From 8 1/2" x 14" to 11" x 17"	50 to 200%	♥: 115% ♦: 121%	
*15	Full Size	Adjusts the full size magnification ratio.	50 to 200%	100%	
*16	Page Margin	Adjusts the create margin magnification ratio.	50 to 200%	93%	
*17	♥: A3 → B4 Mag. Ratio ♦: LG → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A3 to B4 ♦: From 8 1/2" x 14" to 8 1/2" x 11"	50 to 200%	♥: 87% ♦: 77%	
*18	♥: B4 → A4 Mag. Ratio ♦: ** → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From B4 to A4 ♦: From 11" x 15" to 8 1/2" x 11"	50 to 200%	♥: 82% ♦: 74%	
*19	♥: A3 → A4 Mag. Ratio ♦: DLT → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A3 to A4 ♦: From 11" x 17" to 8 1/2" x 11"	50 to 200%	♥: 71% ♦: 65%	
*20	Buzzer On	Turns the beeper ON or OFF	0: No 1: Yes	0	
*21	Prints/Master Cost	Adjusts the cost ratio of masters to prints for accounting purposes.	0 to 50	0	The set number (0 to 50) is automatically added to the key counter each time a master is used.
22	Read Image Area	Not used	—	0	Not used
*23	Online Paper Size	Used only in Japan	0: A6 1: A5	0	Not used
25	Sorter Feed Speed	Determines the transport belt speed in the TS sorter.	0: -20% 6: +15% 1: -15% 7: +20% 2: -10% 8: +25% 3: -5% 9: +30% 4: +5% 10: 0% 5: +10%	10	
26-1	Sorter Priority	Determines the sorter priority.	0: Normal 1: Others	0	

No.	Display	Function	Data	Factory Setting	Comments
26-2	0: 1st/2nd 1: 2nd/1st 2. 1st 3. 2nd	Determines the sorter priority when "1" is selected in SP26-1.	0: 1st sorter first 1: 2nd sorter first 2: 1st sorter only 3: 2nd sorter only	0	If "2" or "3" is selected, only one sorter is used.
27	Auto Staple Off	Specifies whether the staple unit is disabled.	0: Staple mode enabled. 1: Staple mode disabled.	0	
28	Max. Print/Bin	Specifies the sort/stack number limit.	1 to 50 sheets	50	
**29	Pht Bckgrnd Correct	Determines whether the original background correction is done in Photo mode.	0: Correction is not done. 1: Correction is done.	0	
30	Sub Scan Mag. Adjust	Adjusts the sub-scan magnification.	–1.9 to +1.9%	(0)	The factory setting depends on the machine.
31	MTF Level	Adjusts the MTF level.	0: Low 1: Standard 2: High 3: Maximum	1	
32	Image Density Rank	In line mode, adjusts the image density level.	0: Light 1: Standard 2: Dark	1	
33	Lead Edge Margin	Adjusts the lead edge margin.	4 to 10 mm	5 mm	
34	Line/Pht Mode Level	Use to adjust the threshold level for separating line areas and photo areas in the Line/Photo mode.	0: Change the threshold setting 1: Returns the setting to default	0	If "0" is selected in this mode, the machine goes to 34-1.
34-1	Contrast	Select the contrast setting for changing the threshold for line and photo.	0: Standard 1: Light 2: Dark		Depending on the number selected in this mode, the machine goes to 34-1-0, 34-1-2, or 34-1-3.

No.	Display	Function	Data	Factory Setting	Comments
34-1-0	Std (setting for the Standard tone)	Adjust the threshold level to distinguish line and photo areas for the Standard tone setting in the Line/Photo mode. There are four numbers and each represents the threshold value for an image density. Input the required value for the one that is blinking, then press Enter to move the next one.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 18 Std: 16 Dk: 22 Dkr: 22	If "0" is selected in 34-1, the machine goes to this mode.
34-1-1	Lt (setting for the Light tone)	Adjust the threshold level to distinguish line and photo areas for the Light tone setting in the Line/Photo mode.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 16 Std: 14 Dk: 14 Dkr: 14	
34-1-2	Dk (setting for the Dark tone)	Adjust the threshold level to distinguish line and photo areas for the Dark tone setting in the Line/Photo mode.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 8 Std: 10 Dk: 14 Dkr: 14	
35	Head Energy Adjust	Selects normal mode or Economy mode for changing the thermal head energy.	0: Normal mode 1: Economy mode		Depending on the number selected in this mode, the machine goes to 35-1 or 35-2.
35-1	Head Energy Adjust (Normal)	Adjusts the thermal head energy for the normal mode.	0 to -99 (%)	7	
35-2	Head Energy Adjust (Economy)	Adjusts the thermal head energy for the Economy mode.	0 to -99 (%)	35	
36	Sub Scan Mag. Adjust (ADF)	Adjusts the ADF sub-scan magnification.	-1.9 to 1.9 %	0	0.1 % steps
37	Shadow Erase Level	Selects the image mode for adjusting the threshold level for shadow erase.	0: Line 1: Photo 2: Returns the settings to the defaults		If "0" or "1" is selected in this mode, the machine goes to 37-0 or 37-1.

No.	Display	Function	Data	Factory Setting	Comments
37-0	Line	Adjusts the shadow erase threshold level for Line mode. There are four numbers and each represents the threshold value for an image density. Input the required value for the one that is blinking, then press Enter to move the next one.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 27 Std: 19 Dk: 15 Dkr: 10	
37-1	Contrast (Photo)	Selects the contrast setting for adjusting the threshold level for shadow erase in Photo mode.	0: Standard 1: Light 2:Dark		Depending on the number selected in this mode, the machine goes to 37-1-0, 37-1-1 or 37-1-2.
37-1-0	Std (setting for the normal tone)	Adjusts the shadow erase threshold for the Normal contrast setting in Photo mode. There are four numbers and each represents the threshold value for an image density. Input the required value for the one that is blinking, then press Enter to move the next one.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 24 Std: 15 Dk: 11 Dkr: 4	
37-1-1	Lt (setting for the light tone)	Adjusts the shadow erase threshold for the Light Tone contrast setting in Photo mode.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 31 Std: 24 Dk: 15 Dkr: 9	
37-1-2	Dk (setting for the dark tone)	Adjusts the threshold value for shadow erase of the Dark tone contrast in Photo mode.	Lt: 0 to 63 Std: 0 to 63 Dk: 0 to 63 Dkr: 0 to 63	Lt: 12 Std: 7 Dk: 5 Dkr: 2	
38	ADF Scan Line Adjust	Adjusts the ADF scanning start position.	-4.9 to 4.9 mm	0	0.1 mm steps See remarks (1).
39	Image Center Adjustment	Adjusts the center position of copies in the ADF and platen modes.	0: Scanner 1: ADF	0	See remarks (2).

No.	Display	Function	Data	Factory Setting	Comments
39-0	Image Center Adjustment: Scanner	Adjusts the center position of copies in platen mode.	-4.9 to 4.9 mm	0	0.1 mm steps
39-1	Image Center Adjustment: ADF	Adjusts the center position of copies in ADF mode.	-4.9 to 4.9 mm	0	0.1 mm steps
*40	Original	Specifies the image mode at power-up.	0: Photo 1: Line 2: Line/Photo	1	
*41	Image Density	Specifies the image density at power-up.	0: Light 1: Standard 2: Dark 3: Darker	1	
42	Print Speed	Specifies the printing speed at power-up.	0: 60 rpm 1: 75 rpm 2: 90 rpm 3: 105 rpm 4: 120 rpm	2	
*43	Auto Cycle Mode	Specifies whether Auto Cycle mode is selected at power-up.	0: No 1: Yes	0	
*44	Memory/Class Mode	Specifies the initial job memory feature (Memory or Class mode) at power-up.	0: Class 1: Memory	1	
45	Std. Image Position	Specifies the image position at power-up	1: +15 mm 2: +10 mm 3: +5 mm 4: 0 mm 5: –5 mm 6: –10 mm 7: –15 mm 8: –20 mm	4	
*46	Make Up	Specifies the initial make-up background pattern when the Image Make-up mode is selected.	1 to 40 51 to 90 101 to 140 151 to 190	0	0: No background pattern is selected.
47	Contrast	Specifies the initial contrast when the Photo mode is selected.	0: Standard 1: Light 2: Dark	0	
48	Photo	Specifies the initial screen when the Photo mode is selected.	0: Standard 1: Fine 2: Coarse	0	

No.	Display	Function	Data	Factory Setting	Comments
*50	Directional Mag. Mode	Selects which is used to input directional magnifications: reproduction ratios or vertical and horizontal lengths.	0: Reproduction ratios 1: Vertical and horizontal lengths	0	
60	Clear All Memory	Returns all SP modes to the default settings.	0: No 1: Yes	0	
61	Clear Memory / Except SP 30, 36, 38, 39	Returns all SP modes to the default settings except for SP No. 30, 36, 38 and 39	0: No 1: Yes	0	
70	Original Feed Jam (A)	Displays the total number of original jams.		0	
71	Paper Feed Jam (B)	Displays the total number of paper feed jams.		0	
72	Paper Wrap Jam (E)/(B)(E)	Displays the total number of times that paper has accidentally wrapped around the drum.		0	
73	Paper Delivery Jam (G)	Displays the total number of paper delivery jams.		0	
74	Master Feed Jam (C)	Displays the total number of master feed jams.		0	
75	Master Delivery Jam (F)	Displays the total number of master delivery jams.		0	
76	Clear Jam Counters	Clears all jam counters.	0: No 1: Yes	0	
77	Last Sorter Jam	Displays the jam code for the last sorter jam.			
**79	Eco/Quality Start	Specifies if Quality Start operation is done for every master making.	0: No 1: Yes	0	If "1" is selected in 79, the machine goes to 79-1.
79-1	Idling Number	Specifies the number of drum rotations for Quality Start.	0 to 10	2	If "0" is selected in SP79, the number of rotations is determined by SP80.

No.	Display	Function	Data	Factory Setting	Comments
*80	Auto Eco/Q Start	Specifies whether Quality Start is done or not. If "Yes" is selected, the machine goes to "Idling No." mode. The idling number can be selected separately corresponding to the machine off time; 0 to 6 hours, 6 to 32 hours, and more than 32 hours.	0: No 1: Yes	1	If "1" is selected in 80, the machine goes to 80-1.
80-1-1	Idling Number (after a 0 to 6 hour interval)	Specifies the drum rotation number for the machine off time 0 to 6 hours.	0 to 10	0	If Enter key is pressed in this mode, the machine goes to 80-1-2.
80-1-2	Idling Number (after a 6 to 32 hour interval)	Specifies the drum rotation number for when the machine was off from 6 to 32 hours.	0 to 10	2	If Enter key is pressed in this mode, the machine goes to 80-1-3.
80-1-3	Idling Number (after an intermal of more than 32 hours)	Specifies the drum rotation number for when the machine was off from more than 32 hours.	0 to 10	3	
81	Proof Print No.	Specifies how many trial prints are made after making the master.	0 to 2 sheets	1	
*82-1	Skip Feed No.	Selects the feed interval.	1 to 9	2	1: Normal operation 2 to 9: One sheet fed every two to nine drum rotations
-2	Long Sheet ?	Specifies whether a long sheet is used. (If "Yes" is selected, paper exit jam detection is not done.)	0: No 1: Yes	0	Displays only when no. 2 to 9 are selected in 82-1.
*83	Auto Reset Time	Specifies the auto reset time.	0: No 1 to 5 min.	0	

No.	Display	Function	Data	Factory Setting	Comments
**84	Auto Multi-copy	Specifies the initial mode for Multi copy.	0: Normal 1: Auto (Two or four identical images are made if the Master Making key is pressed once.)	0	
85	Initial Com-pression	Specifies whether full master box detection is made at power-up.	0: No 1: Yes	0	
86	A3 Drum 2 Count Up	Specifies whether the counter increments by two counts per print when the A3 drum is used.	0: No 1: Only the master counter 2: Both the master and the copy counter	0 Ricoh, AB Dick 2 NRG	See Remarks (3)
**87	Memory Print	Specifies the printing operation when in Memory mode.	0: Memory 1: Stack	0	See Remarks (4).
**88	Auto Memory/ Class	Specifies whether Auto Memory/Class mode is used.	0: No 1: Yes	1	See Remarks (5).
**89	Gray/Tint Mode	Select "Yes" to make a "Tint" image. (If "Tint" mode is selected, the Screen, Contrast, and Image Density keys are not available.)	0: No 1: Yes	0	
90	Thermal Head Test	Selects the background pattern for the copy made in the thermal head test; performs the test.	1 to 40 51 to 90 101 to 140 151 to 190	7	See the Thermal Head Test section.
91	Command Sheet Check	Prints the command sheet image (designated area) together with the original image.	0: No 1: Yes	0	See the Command Sheet Check section.
92	Thermal Paper Mode	Use this mode to test the thermal head.	0: No 1: Yes	0	See Remarks (6)
93	Erase Area Check	Checks the erase area.	0: No 1: Yes	0	See Remarks (7)
95 -1	Scanner Free Run	Selects the type of scanner free run.	0: With the lamp off 1: With the lamp on	0	See Remarks (8)

Service Tables

No.	Display	Function	Data	Factory Setting	Comments
-2	Scanner Free Run	Carries out the scanner free run. (The speed can be changed: see Remarks (8).)	Start with the Print Start key. Stop with the Stop key.		Displays when pressing # after selecting 0 or 1 in 95-1.
96	ADF Original Feed Check	Carries out the ADF original feed check. (The speed can be changed; see Remarks (9).)	Start with the Print Start key. Stop with the Stop key.		See Remarks (9)
98	Economy Count	Displays the total number of masters made in Economy mode.		0	
99	Staple Count	Displays the total number of stapling operations done so far.		0	
100	Multi-copy Count	Displays the total number of masters made in Multi-copy mode.		0	
101	Make Up Count	Displays the total number of masters made in Make-up mode.		0	
102	Make Up Photo Count	Displays the total number of masters made in Make-up Photo mode.		0	
103	Margin Erase Count	Displays the total number of masters made with the Margin Erase key.		0	
104	On line Count	Displays the total number of masters made in On Line mode.		0	
105	Overlay Count	Displays the total number of masters made in Overlay mode.		0	
106	Enlarge Count	Displays the total number of masters made in Fixed Enlargement mode.		0	
107	Reduction Count	Displays the total number of masters made in Fixed Reduction mode.		0	

No.	Display	Function	Data	Factory Setting	Comments
108	Zoom Count	Displays the total number of masters made in Zoom mode.		0	
109	Directional Mag.	Displays the total number of masters made in Directional Magnification mode.		0	
110	Power On Time	Displays the total amount of time the machine has been turned on.		0	xxxxx Hour xx Minutes xx Seconds
111	Total Count	Displays the total number of masters and prints.		0	M: Master count P: Print count
*113	Resettable Count	Used by the customer to display the total number of masters and prints.		0	M: Master count P: Print count
*114	CLR Reset-table Count	Clears the resettable total master/print counters.	0: No 1: Yes	0	
115	ADF Mode Count	Displays the total number of sheets fed in the ADF mode.		0	
116	Scanner Mode Count	Displays the total number of originals set in platen mode.		0	
117	Color Drum Count	Displays the total number of prints when using the color drum.		0	
118	Paper Size Count	Displays the total number of prints made in each paper size. See Remarks (10).		0	Display counters for each paper size by pressing the # key.
119	CLR All Total Count	Clears the following counters: SP Nos. 111, 115, 116, 117, and 118.	0: No 1: Yes	0	
*120 -1	User Code Mode	Selects user code mode, and displays the total number of prints made in the User Code mode.	0: No 1: Yes	0	See the user code mode section.

No.	Display	Function	Data	Factory Setting	Comments
-2	Auto Reset Time	Selects the auto reset time.	0: Unlimited 1: 3 min. 2: 5 min.	0	Displays only when "Yes" is selected in 120-1.
*121.	UC Count	Displays the total number of masters and prints made by each user code.		0	Press the # key to shift to another user code.
*122	Clear UC Count	Clears every user code counter.	0: No 1: Yes	0	Same as above.
*123	Total UC Count	Displays the total number of masters and prints for up to 20 user codes.		0	
*124	Clear Total UC Count	Clears the total user code counter.	0: No 1: Yes	0	
130	Input Check Mode	Displays the inputs from sensors and switches.			See the input check table.
131	Output Check Mode	Turns on the electrical components.			See the output check table.
132	All Indicators ON	Turns on all the indicators on the operation panel.			Press the # key to light all the indicators.
133	Sorter Cleaning Mode	In this mode, one bin shift is carried out when the Print Start key is pressed. First, select the 1st sorter or 2nd sorter.	1: 1st Sorter 2: 2nd Sorter	1	Depending on the number selected in this mode, the machine goes to 133-1 or 133-2.
133-1	Sorter Cleaning Mode (1st Sorter)	1. When the Print Start key is pressed once, the bin returns to the home position. 2. Each time the Print Start key is pressed after this, one bin shift is carried out. When the 20th bin shift is done, the bins return to the home position.			

No.	Display	Function	Data	Factory Setting	Comments
133-2	Sorter Cleaning Mode (2nd Sorter)	1. When the Print Start key is pressed once, the bin returns to the home position. 2. Each time the Print Start key is pressed after this, one bin shift is carried out. When the 20th bin shift is done, the bins return to the home position.			
135	SN: 1st Paper Exit	Displays the 1st paper exit sensor voltage.			Unit: Volts
136	SN: 2nd Paper Exit	Displays the 2nd paper exit sensor voltage.			Unit: Volts
137	SN: Master Eject	Displays the master eject sensor voltage.			Unit: Volts
138	SN: Drum Master	Displays the drum master sensor voltage.			Unit: Volts
140	Ink Detection	Specifies whether ink detection is done.	0: No 1: Yes	1	
141	Paper Detection	Specifies whether paper end detection is done.	0: No 1: Yes	1	
** 141-1	Size Detection	Specifies whether paper size detection is done or not.	0: Yes 1: No size detection	0	If "0" is selected in this mode, the machine goes to 142-2.
141-2	Size Detection OFF?	Specifies whether the paper size indication on the operation panel is erased.	0: No 1: Yes	0	
*143	Orig. Size Detection	Specifies whether original size detection is done.	0: No 1: Yes	1	
145	Drum Mast. Detection	Specifies whether drum master detection is done.	0: No 1: Yes	1	
146	ADF Cover Detection	This mode disables the ADF Cover Sensor.	0: Disabled 1: Enabled	1	
147	Platen Set Detection	This mode disables the ADF Set Sensor.	0: Disabled (the ADF is always set) 1: Enabled	1	
150	Control ROM No.	Displays the ROM part number and the ROM manufacturing date.		P/No.	1994/10/07 = YYYY/MM/DD

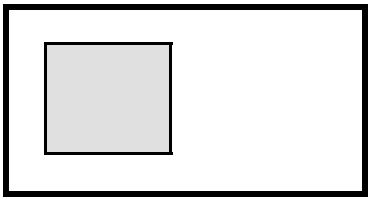
No.	Display	Function	Data	Factory Setting	Comments
151	Machine No.	Displays the machine serial number and the installation date.		0	Input the serial number and the installation date.
152	Service Tel. No.	Input the service representative's telephone number, which is displayed with the service call code.		0	Use the number keys to input the telephone number at installation. Press the Memory/ Class key if you wish to add a space between the digits.
153	Last Service Code	Displays the last service call.		0	
*160	♥: Margin Ers. A3 ❑ ♦: Margin Ers. 11x17❑	Adjust the margin erase area. ♥: A3 ♦: 11" x 17"	(50 to 307) x (50 to 432) mm	♥: 289 x 416mm ♦: 271 x 428mm	
*161	♥: Margin Ers. B4 ❑ ♦: Margin Ers. 8.5 x 14	Adjust the margin erase area. ♥: B4 ♦: 8 1/2" x 14"	(50 to 307) x (50 to 432) mm	♥: 249 x 360mm ♦: 208 x 352 mm	
*162	♥: Margin Ers. A4 ❑ ♦: Margin Ers. 8.5x11 ❑	Adjust the margin erase area. ♥: A4 Landscape ♦: 8 1/2" x 11" Landscape	(50 to 307) x (50 to 432) mm	♥: 202 x 293 mm ♦: 208 x 275 mm	
*163	♥: Margin Ers. A4 ❑ ♦: Margin Ers. 8.5x11 ❑	Adjust the margin erase area. ♥: A4 Portrait ♦: 8 1/2" x 11" Portrait	(50 to 307) x (50 to 432) mm	♥: 289 x 206 mm ♦: 271 x 212 mm	

No.	Display	Function	Data	Factory Setting	Comments
*164	♥: Margin Ers. B5 ❑ ♦: Margin Ers. 5.5x8.5 ❑	Adjust the margin erase area. ♥: B5 Landscape ♦: 5 1/2" x 8 1/2" Landscape	(50 to 307) x (50 to 432) mm	♥: 174 x 253 mm ♦: 132 x 212 mm	
*165	♥: Margin Ers. B5 ❑ ♦: Margin Ers. 5.5x8.5 ❑	Adjust the margin erase area. ♥: B5 Portrait ♦: 5 1/2" x 8 1/2" Portrait	(50 to 307) x (50 to 432) mm	♥: 249 x 178 mm ♦: 208 x 136 mm	
*166	♥: Margin Ers. A5 ❑ ♦: Margin Ers. **1 ❑	Adjust the margin erase area. ♥: A5 Landscape ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 140 x 206 mm ♦: 50x 50 mm	
*167	♥: Margin Ers. A5 ❑ ♦: Margin Ers. **2 ❑	Adjust the margin erase area. ♥: A5 Portrait ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 202 x 144 mm ♦: 50x 50 mm	
*168	♥: Margin Ers. A6 ❑ ♦: Margin Ers. **3 ❑	Adjust the margin erase area. ♥: A6 Landscape ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 97x 144 mm ♦: 50x 50 mm	
*169	♥: Margin Ers. A6 ❑ ♦: Margin Ers. **4 ❑	Adjust the margin erase area. ♥: A6 Portrait ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 140 x 101 mm ♦: 50x 50 mm	
*170	♥: Margin Ers. ** ❑ ♦: Margin Ers. **5 ❑	Adjust the margin erase area. ♥: Others ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 92x 144 mm ♦: 50x 50 mm	

Remarks

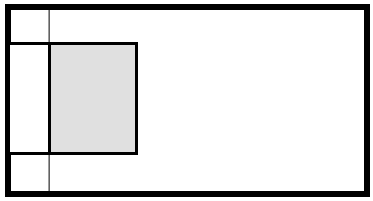
1) SP Mode No. 38 – ADF Scan Line Position
The printing position moves as shown below.

← Direction



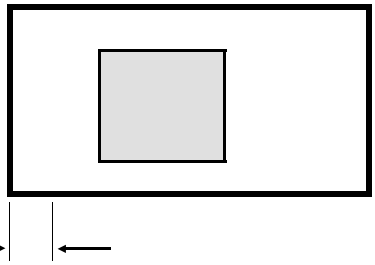
Original Position

+X: Moves X mm to the left



Printing Position

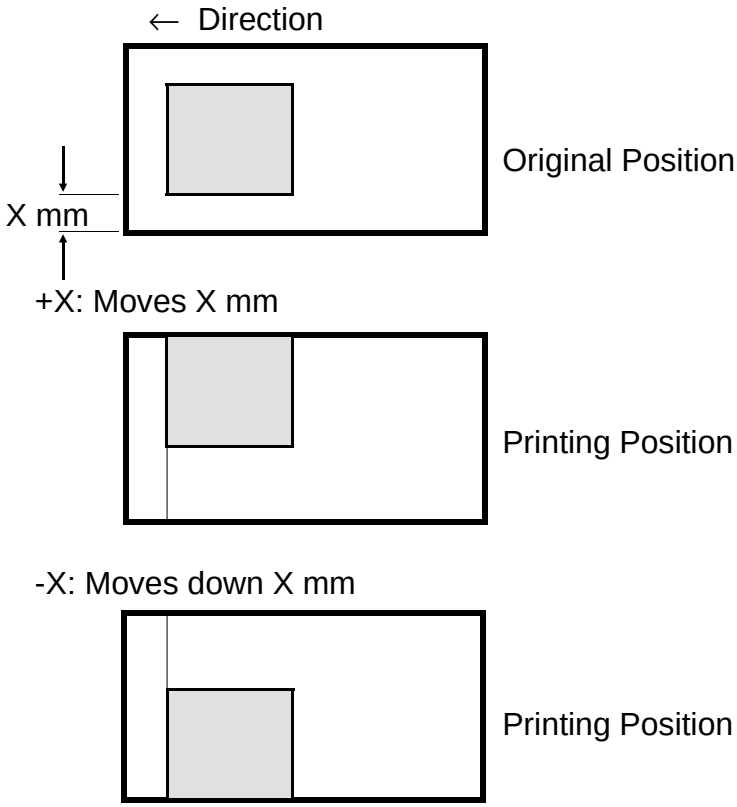
-X: Moves X mm to the right



Printing Position

X mm

2) SP Mode No. 39 – Image Center Position
The printing position moves as shown below.



Note: When adjusting the scanner image position input "0" first:
Example) X = 0.9 mm → "0", "9", and then press the # key.

3) SP Mode No. 86 – A3 Drum 2 Count Up

The counter increment goes up by 2 if an A3 drum is installed, regardless of the size of paper.
The default setting is changed with DIP switch 102-5. See Sub-section 2.3.1. of section 4.

4) SP Mode No. 87 – Memory Print

Normally, in platen mode (when no originals are placed in the ADF), the machine stops when the 1st print job is finished even if the tape marker is installed, so that the next original can be placed. The next printing job starts when the Print Start key is pressed.
If "1" is selected in this mode, after the 1st print job is finished, the tape marker feeds a strip of tape and the next print job starts immediately afterwards.

5) SP Mode No. 88 – Auto Memory/ Class

In Memory/Class mode, the machine normally stops when the first print job is finished if the tape marker is not installed.
If "1" is selected in this mode, the machine stops for a while (this interval is the same as when the tape marker is operating). Then it continues with the next print (or master making) job.

6) SP Mode 92 – Thermal Paper Mode

You can use this mode to test the thermal head.

Place some thermal printer in the plotter face down and change this SP Mode to 1. Place an original on the exposure glass and press the Master Making key. The machine starts printing on the thermal paper without doing the master clamp process.

You can also enable SP Mode 90 and press the Master Making key to test the thermal head without placing an original on the exposure glass.

7) SP Mode 93 – Erase Area Check

This checks the erased area for shadow erase (Center and Edge Margin Erasing). If you make a master and print an image with this mode, the machine makes a background pattern on the area to be erased.

8) SP Mode No. 95 – Scanner Free Run

- It is possible to change the first scanner speed by changing the magnification ratio:
  25 to 200 % (Maximum speed = 25 %)
- To start the scanner free run, press the Print Start key after selecting "Lamp On/Off" using the # key.
  Input a magnification ratio if you wish to change the first scanner speed, before you press the Start key. (Factory setting = 25 %)
- To stop the scanner free run, press the Stop key. The scanner returns to home position, then stops.
- The machine does not exit SP mode until the scanner returns to home position correctly.

9) SP Mode No. 96 – ADF Original Feed Check

- It is possible to change the original feed speed by changing the magnification ratio:
  25 to 200 % (Maximum speed = 25 %)
- To start original feed, press the Print Start key after placing originals in the ADF.
  Input a magnification ratio if you wish to change the original feed speed, before you press the Start key. The ADF starts feeding until all originals are fed.
- To stop feeding, press the Stop key. The original stops at this moment.
- If the original feed fails, or if the Stop key is pressed, the "A + Jam" indicator turns on.
  If the jammed originals are removed from the ADF, the jam indicator turns off and the failure is reset.
- The machine does not exit SP mode during feeding.

10) SP Mode No. 118 – Print Size Count

- The print size counter indicates the following paper sizes:

A4 version	**LT version**
• A3	• DLT
• B4	• LG
• A4 Landscape	• LT Landscape
• A4 Portrait	• LT Portrait
• B5 Landscape	• HLT
• B5 Portrait	• * (Others)
• * (Others)	

3.3 THERMAL HEAD TEST

This function is used to determine which printer component is causing an image problem on the master.

In this mode, the background pattern that is printed covers the entire sheet of paper.

Procedure

1. Place paper on the paper table.

   NOTE: To reduce thermal head load, use the smallest paper size possible, i.e. the smallest paper width on which the part with the image problem can be printed.

2. Access SP mode.
3. Input No. 90 and press the Enter key.

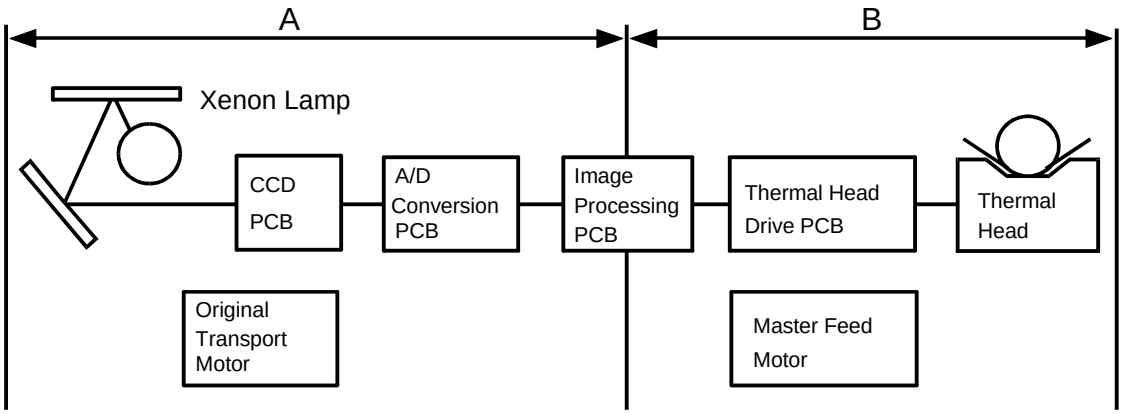
   NOTE: The factory setting is pattern No. 7. If necessary, input another background pattern with the Number keys.

4. Press the Master Making key (an original is not necessary).
5. Make some prints and check the image.

Assessment

If the printout is normal, a Part A component is defective.

If the printout is abnormal, a Part B component is defective.



C223M511.wmf

- This mode can be used in combination with SP mode No. 92, Thermal Paper Mode.

3.4 COMMAND SHEET CHECK

Normally, Fn 9 or Fn 19 cannot be input in Make-up mode.

By changing the data of SP mode #91 from 0 to 1, Fn 9 or Fn 19 can be input.

Command No.	Display	Function
Fn 9	OVERLAY	Prints both the original image and designated area of the command sheet on the paper.
Fn 19	OVERLAY	

This function is used to check the position of the designated area on the command sheet. It is checked in relation to the original image to make sure that the command sheet is being read correctly.

Procedure

1. Access SP mode.
2. Input 91 and press the Enter key.
3. Input 1 with the number keys and press the Enter key.
4. Press the Clear Modes key to leave SP mode.
5. Place the command sheet and the original on the ADF.
6. Press the Make-up key and input Fn 9 or Fn 19 (these commands have the same function).
7. Input 1 for the undesignated area.
8. Press the Master Making key and then check the print to make sure that the area designated by the command sheet is in the correct position on the original image.

NOTE: 1. Only one command sheet can be stored in memory. If two or more command sheets are read, only the last command sheet is output.

2. Make sure to return the SP mode to its original setting after checking the designated area position.

3.5 INPUT/OUTPUT CHECK MODE

This program checks the electrical components. The procedure for accessing the program is as follows:

3.5.1 Input Check Mode Access Procedure

1. Access SP mode. (See the SP mode access procedure.)
2. Enter 130 (SP mode number) with the number keys.
3. Press the Enter key.
4. Enter the desired input number. (See the input check table.)

   NOTE: The input number can be shifted up or down by pressing the Zoom key.

5. Press the Enter key.

   NOTE: In the input check mode, all image position LEDs and printing speed LEDs turn on when a sensor or switch that is being tested is actuated. A beep will also be heard.

6. Press the Enter key to return the display to the initial input check menu.
7. Press the Clear Modes key to leave SP mode.

3.5.2 Output Check Mode Access Procedure

1. Access SP mode. (See the SP mode access procedure.)
2. Enter 131 (SP mode number) with the number keys.
3. Press the Enter key.
4. Enter the desired output number. (See the output check table.)

   NOTE: The output number can be shifted up or down by pressing the Zoom key ("+" or "–").

5. Press the Enter key.
6. Press the Print Start key to turn on the component.
7. Press the Enter key to return the display to the initial output check menu.
8. Press the Clear Modes key to leave the SP mode.

3.5.3 Input Check Table

Code	LCD Display	Component Checked
1.	SN: ADF Cover In- 1	ADF Cover Sensor
2.	SN: 1st Original (ADF) In- 2	Original Set Sensor
3.	SN: 2nd Original (ADF) In- 3	Original Registration Sensor
4.	SN: 3rd Original (ADF) In- 4	Scan Line Sensor
5.	SN: Original Size 0 In- 5	Original Width Sensor – 0
6.	SN: Original Size 1 In- 6	Original Width Sensor – 1
7.	SN: Original Size 2 In- 7	Original Width Sensor – 2
8.	SN: Original Size 3 In- 8	Original Width Sensor – 3
9.	SN: Cassette Size 0 In- 9	Cassette Size Switch – 4
10.	SN: Cassette Size 1 In-10	Cassette Size Switch – 3
11.	SN: Cassette Size 2 In-11	Cassette Size Switch – 2
12.	SN: Cassette Size 3 In-12	Cassette Size Switch – 1
13.	SN: Paper Size 0 In-13	Paper Width Sensor – 0
14.	SN: Paper Size 1 In-14	Paper Width Sensor – 1
15.	SN: Paper Size 2 In-15	Paper Width Sensor – 2
16.	SN: Paper Size 3 In-16	Paper Width Sensor – 3
17.	SN: Paper Size 4 In-17	Paper Length Sensor
18.	SN: Paper End In-18	Paper End Sensor
19.	SW: Paper Table Open In-19	Paper Table Open Switch
20.	SN: Paper Table Low Limit In-20	Paper Table Lower Limit Sensor
21.	SN: Paper Table Height In-21	Paper Table Height Sensor
22.	KEY: Lower Paper Feed Table In-22	Paper Table Down key

Code	LCD Display	Component Checked
23.	SW: Right Cutter In-23	Right Cutter Switch
24.	SW: Left Cutter In-24	Left Cutter Switch
25.	SN: Master Buckle In-25	Master Buckle Sensor
26.	SN: Master End In-26	Master End Sensor
27.	SIG: Ink In-27	When the Ink Detecting Pin detects ink
28.	SIG: Color Drum In-28	When a color drum is installed
29.	SIG: Drum Size 0 In-29	When an A3/DLT or A4/LG drum is installed
30.	SIG: Drum Size 1 In-30	When an A4/LT drum is installed
30.	SIG: Drum Set In-30	When an A4/LT drum is installed
31.	SN: Pressure Plate High Position In-31	Upper Pressure Plate Sensor
32.	SN: Pressure Plate Low Position In-32	Lower Pressure Plate Sensor
33.	SW: Master Eject Box In-33	Master Eject Box Switch
34.	SN: Full Master In-34	Full Master Box Sensor
35.	SN: Printing Pressure In-35	Printing Pressure Sensor
36.	SN: 1st Drum Position In-36	First Drum Position Sensor
37.	SN: 2nd Drum Position In-37	Second Drum Position Sensor
38.	SW: Manual Master Cut In-38	Master Cut Switch
39.	SIG: Key Counter In-39	When a key counter is installed
40.	SIG: Power Supply Temp. Detect In-40	When the power supply unit temperature is over 85°C
41.	SN: 1st Paper Exit In-41	First Paper Exit Sensor
42.	SN: 2nd Paper Exit In-42	Second Paper Exit Sensor
43.	SN: Master Eject In-43	Master Eject Sensor
44.	SN: Drum Master In-44	Drum Master Sensor

Code	LCD Display	Component Checked
45	SN: Scanner Home Position In-45	Scanner Home Position Sensor
46	SN: Platen Angle (Scanner) In-46	Platen Cover Position Sensor
47	SN: Platen Set (Scanner) In-47	ADF Set Sensor
48	SN: Platen Original (Scanner) In-48	Original Sensor
49	SN: 4th Original (ADF) In-49	Original Exit Sensor
50	SW: Delivery Table Open In-50	Delivery Table Open Switch
60	SN: Feed Unit Low (1st Sorter) In-60	1st Transport Non-Sort Mode Position Sensor (Sorter)
61	SN: Feed Unit High (1st Sorter) In-60	1st Transport Sort Mode Position Sensor (Sorter)
62	SN: Feed Unit Cover (1st Sorter) In-62	1st Transport Cover Open Switch (Sorter)
63	SN: Safety Switch (1st Sorter) In-63	Staple Cover Open Switch (1st Sorter)
64	SN: Staple Cover (1st Sorter) In-64	Staple Cover Open Switch (1st Sorter)
65	SN: Paper Edge (1st Sorter) In-65	Trailing Edge Sensor (Sorter)
66	SN: Sort Paper (1st Sorter) In-66	1st Transport Sensor (Sorter)
67	SN:Stapler Position (1st Sorter) In-67	Staple Position Switch (1st Sorter)
68	SN: Stapler Unit Move (1st Sorter) In-68	Staple Unit Movement Switch (1st Sorter)
69	SN: Stapler H.P. (1st Sorter) In-69	Staple Home Position Sensor (1st Sorter)
70	SN;Staple End (1st Sorter) In-70	Staple End Sensor (1st Sorter)
71	SN: Jogger Bar H.P. (1st Sorter) In-71	Jogger Bar Home Position Sensor (1st Sorter)
72	SN: Lead Cam H.P. (1st Sorter) In-72	Helical Wheel Position Sensor (1st Sorter)
73	SN: Bin Home Position (1st Sorter) In-73	Bin Unit Home Position Sensor (1st Sorter)
74	SN: Bin Paper (1st Sorter) In-74	Bin/Jam Sensor (1st Sorter)
75	KEY: Stapler (1st Sorter) In-75	Manual Staple Key (1st Sorter)
76	SN: Staple Paper (1st Sorter) In-76	Paper Sensor-Stapler (1st Sorter)

Code	LCD Display	Component Checked
77	SN: Bin Shift MT CLK (1st Sorter) In-77	Bin Shift Motor Rotation Sensor (1st Sorter)
78	SN: Feed Motor CLK1 (1st Sorter) In-78	1st Transport Motor Rotation Sensor (1st Sorter)
79	SN: Feed Motor CLK2 (1st Sorter) In-79	2nd Transport Motor Rotation Sensor (Sorter)
80	SN: Staple Cover (2nd Sorter) In-80	Staple Cover Open Switch (2nd Sorter)
81	SN: Paper Edge (2nd Sorter) In-81	Trailing Edge Sensor (2nd Sorter)
82	SN: Sort Paper (2nd Sorter) In-82	2nd Transport Sensor (Sorter)
83	SN: Stapler Position (2nd Sorter) In-83	Staple Position Switch (2nd Sorter)
84	SN: Stapler Unit Move (2nd Sorter) IN-84	Staple Home Position Sensor (2nd Sorter)
85	SN: Stapler H.P. (2nd Sorter) IN-85	Staple End Sensor (2nd Sorter)
86	SN: Staple End (2nd Sorter) In-86	Staple End Sensor (2nd Sorter)
87	SN: Jogger Bar H.P. (2nd Sorter) In-87	Jogger Bar Home Position Sensor (2nd Sorter)
88	SN: Lead Cam H.P. (2nd Sorter) In-88	Helical Wheel Home Position Sensor (2nd Sorter)
89	SN: Bin Home Position (2nd sorter) In-89	Bin Unit Home Position Sensor (2nd Sorter)
90	SN: Bin Paper (2nd Sorter) In-90	Bin/Jam Sensor (2nd Sorter)
91	KEY: Stapler (2nd Sorter) In-91	Manual Staple Key (2nd Sorter)
92	SN: Stapler Paper (2nd Sorter) In-92	Paper Sensor-Stapler (2nd Sorter)
93	SN: Bin Shift MT .LK (2nd Sorter) In-93	Bin Shift Motor Rotation Sensor (2nd Sorter)
100	SN: Cassette Paper	Cassette Paper End Sensor (LCT)
101	SN: Paper End	Tray Paper Position Sensor (LCT)
102	SN: Paper Position	Tray Paper Position Sensor (LCT)
103	SIG: LCT	CN110 Connection (Should be ON when connected)
104	SN: Low Limit	Tray Lower Limit Sensor (LCT)
105	SN: Paper MAX. Limit	Maximum Paper Load Sensor (LCT)
106	KEY: Lower LCT	Tray Down Switch (LCT)
107	SN: Paper Size 0	Paper Size Sensor 0 (LCT)
108	SN: Paper Size 1	Paper Size Sensor 1 (LCT)
109	SN: Paper Size 2	Paper Size Sensor 2 (LCT)
110	SN: Paper Size 3	Paper Size Sensor 3 (LCT)

Code	LCD Display	Component Checked
111	SN: Paper Size 4	Paper Size Sensor 4 (LCT)
112	SN: LCT Cover	Cover Open Switch (LCT)
113	SIG: Cassette	Cassette Switch (LCT)

3.5.4 Output Check Table

Code	LCD Display	Description
2	MOTOR: ADF Drive Out- 2	Turns on the ADF drive motor.
3	MOTOR: Master Eject Out- 3	Turns on the master eject motor.
4	MOTOR: Pressure Plate Up/Down Out- 4	Turns on the pressure plate up/down motor.
5	MC: Master Reverse Roller Out- 5	Turns on the master reverse roller magnetic clutch.
6	MOTOR: Vacuum Out- 6	Turns on the vacuum fan motor.
7	MOTOR: Air Knife Out- 7	Turns on the air knife motor.
8	SIG: Key Counter Out- 8	Increments the key counter.
9	COUNTER: Master Out- 9	Increments the master counter.
10	COUNTER: Paper Out-10	Increments the total counter.
11	SOL: Paper Separation Release Out-11	Turns on the separation plate release solenoid.
12	SOL: Ink Supply Out-12	Turns on the ink supply solenoid.
13	SOL: Drum Lock Out-13	Turns on the drum lock solenoid.
14	SOL: Paper Feed/Print Pressure Out-14	Turns on the paper feed solenoid and the printing pressure solenoid.
15	SOL: Master Feed Clamper Out-15	Turns on the master feed clamper solenoid.
16	SOL: Master Eject Clamper Out-16	Turns on the master eject clamper solenoid.
17	SOL: Master Eject Out-17	Turns on the master eject solenoid.
18	RELAY: Paper Table Down Out-18	Turns on the paper table drive motor (down).
19	RELAY: Paper Table Up Out-19	Turns on the paper table drive motor (up).
20	RELAY: Main Motor Reverse Out-20	Turns the drum in the direction opposite to the printing direction.
21	SIG: Fluorescent Lamp Out-21	Turns on the exposure lamp if the Print key is pressed. Turns off the lamp if the Print key is pressed again.
22	MOTOR: Cutter + Direction Out-22	Turns on the cutter motor (moves it to the rear of the machine).
23	MOTOR: Cutter – Direction Out-23	Turns on the cutter motor (moves it to the front of the machine).

Code	LCD Display	Description
24	MOTOR: Image Shift + Direction Out-24	Turns the image position motor in the "+" direction.
25	MOTOR: Image Shift – Direction Out-25	Turns the image position motor in the "–" direction.
26	MOTOR: Main (10 rpm) Out-26	Turns on the main motor (10 rpm).
27	MOTOR: Main (30 rpm) Out-27	Turns on the main motor (30 rpm).
28	MOTOR: Main (1st Speed) Out-28	Turns on the main motor (1st speed).
29	MOTOR: Main (2nd Speed) Out-29	Turns on the main motor (2nd speed).
30	MOTOR: Main (3rd Speed) Out-30	Turns on the main motor (3rd speed).
31	MOTOR: Main (4th Speed) Out-31	Turns on the main motor (4th speed).
32	MOTOR: Main (5th Speed) Out-32	Turns on the main motor (5th speed).
33	MOTOR: Original Feed Out-33	Turns on the original transport motor.
34	MOTOR: Master Feed Out-34	Turns on the master feed motor.
35	MOTOR: Paper Reverse Out-35	Turns on the paper return motor.
36	Turn on drum, feed/ pressure SOLs Out-36	Turns on the main motor (10 rpm), the paper feed solenoid, and the printing pressure solenoid.
37	MOTOR: Scanner	Turns on the scanner motor. Start by pressing the Print Start key. Stop by pressing the Print Start key again. Then the scanner (carriage) returns to home position when the Print Start key is pressed.
38	SOL: Sheet Insert Out-38	Turns on the master press sheet solenoid.
39	SOL: Sheet Pressure Out-39	Turns on the detection arm release solenoid.
40	MOTOR: Master Buckle Out-40	Turns on the master buffer fan motor.
41	SIG: VHD on Out-41	Applies thermal head voltage.
50	EMF Sorter Mode 1 Out-50	Available only when the EMF Sorter is installed.
51	EMF Sorter Mode 2 Out-51	Available only when the EMF Sorter is installed.
52	EMF Sorter Mode 3 Out-53	Available only when the EMF Sorter is installed.
53	EMF Sorter Mode 4 Out-53	Available only when the EMF Sorter is installed.

Code	LCD Display	Description
60	MODE: Feed Unit U/D (1st Sorter) Out-60	Turns on the paper delivery table motor.
61	MOTOR: Paper Feed (1st Sorter) Out-61	Turns on the 1st transport motor.
62	MOTOR: Paper Feed (2nd Sorter) Out-62	Turns on the 2nd transport motor.
63	MODE: Bin Shift (1st Sorter) Out-63	Turns on the bin shift motor (1st Sorter)
64	MODE: Jogger (1st Sorter) Out-64	Turns on the jogger bar motor. (1st Sorter)
65	MODE: Staple (1st Sorter) Out-65	Turns on the staple motor. (1st Sorter)
66	MODE: Bin Home (1st Sort) Out-66	Moves the bins to the home position. (1st Sorter)
67	MODE: Bin Shift (2nd Sorter) Out-67	Turns on the bin shift motor. (2nd Sorter)
68	MODE: Jogger (2nd Sorter) Out-68	Turns on the jogger bar motor. (2nd Sorter)
69	MODE: Staple (2nd Sorter) Out-69	Turns on the staple motor (2nd Sorter)
70	MODE: Bin Home (2nd Sorter) Out-70	Moves the bins to the home position. (2nd Sorter)
71	MODE: Free Running (Sorter) Out-71	The machine simulates sort speration.
100	MOTOR: Table Down (LCT) Out-100	The LCT tray drive motor moves the tray down.
101	Motor:Table Up (LCT) Out-101	The LCT tray drive motor moves the tray up.
102	MOTOR: Cassette Down Out-102	The LCT cassette bottom plate drive motor moves the plate down.
103	MOTOR: Cassette Up (LCT) Out-103	The LCT cassette bottom plate drive motor moves the plate up.

3.6 USER CODE MODE

3.6.1 User Codes

With the user code function, operators must input an authorized code before the machine will operate. The machine keeps track of the number of prints made under each code.

There are 20 user codes as follows:

No.	User Code No.
1	382
2	191
3	182
4	173
5	164
6	155
7	146
8	137
9	128
10	119
11	482
12	291
13	282
14	273
15	264
16	255
17	246
18	237
19	228
20	219

3.6.2 How To Use a User Code

1. Enter the user code (3 digits) with the number keys.
2. Press the Enter key.
3. Press the Master Making key to start printing.

NOTE: The user code mode is reset if the Clear Modes key and the Stop key are pressed together.

4. DRUM INTERCHANGEABILITY

O: Standard combination
Δ: Usable under certain conditions
X: Cannot be used

		C210 Model	C218 Model	C223 Model
Color Drum	VT3000-L (C533)	O	Δ (NOTE 1, 2, 4)	Δ (NOTE 1, 2, 4)
	VT3000-S (C535)	O	Δ (NOTE 1, 2)	Δ (NOTE 1, 2, 4)
	VT3000II-L (C556)	X (NOTE 3)	O	O (NOTE 4)
	VT3000II-S (C559)	X (NOTE 3)	O	O (NOTE 4)

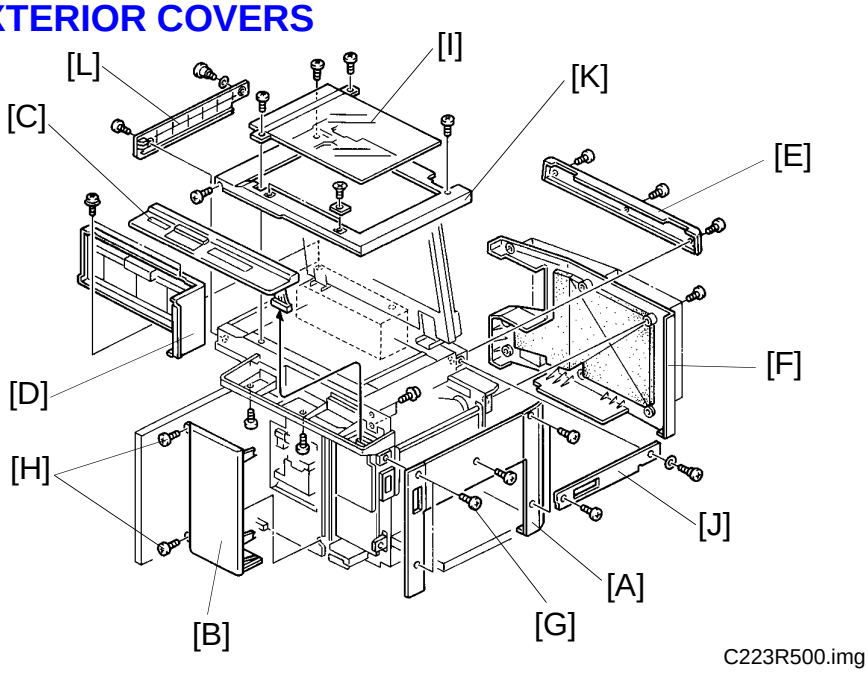
NOTES:
1. The modified clamper and the cloth screen must be installed.
2. For the U.S. version machine, the modified Drum Unit Rail End must be installed (for safety standard reasons).
3. Ink leakage may occur at the trailing edge.
4. A leading margin longer than the machine specification is required for originals (VT3000-L/S: 10 mm, VT3000II-L/S: 8 mm).

SECTION 5

REPLACEMENT AND ADJUSTMENT

1. EXTERIOR

1.1 EXTERIOR COVERS



C223R500.img

When adjusting or disassembling each section, refer to the following procedures on how to remove exterior covers.

[A] Right Cover (5 screws)

[B] Right Front Cover: Open the front door, loosen the 2 screws [G], remove the 2 screws [H].

[C] Operation Panel: Open the front door, slide the scanner unit to the left and remove the 4 screws.

[D] Master Eject Cover: Open the master eject unit and remove the 2 screws.

[E] Upper Rear Cover: Remove the 3 screws.

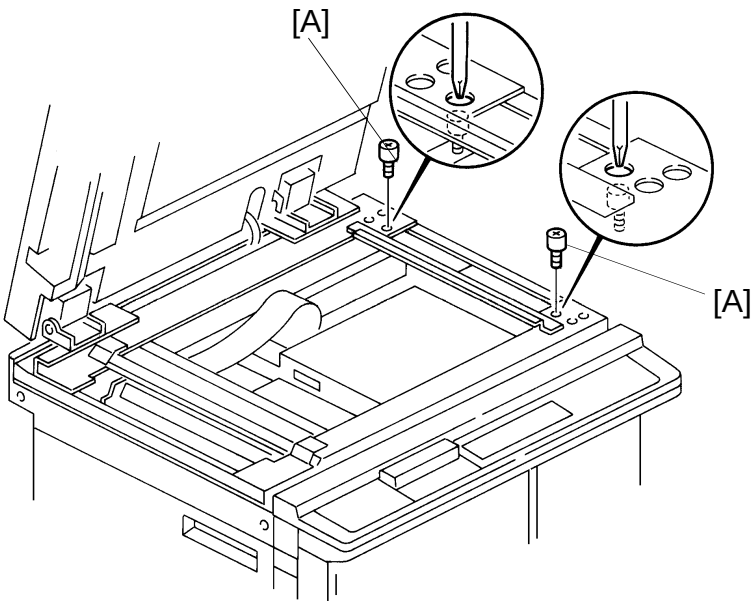
[F] Rear Cover: Remove the 7 screws.

[K] Upper Cover
1: Remove the exposure glass [I] (2 screws).
2: Remove the right upper cover [J] (Front: 1 screw /Rear: 1 stepped screw, 1 washer)
3: Remove the upper cover [K] (5 screws)

[L] Left Upper Cover (Front: 1 screw /Rear: 1 stepped screw, 1 washer).

2. SCANNER

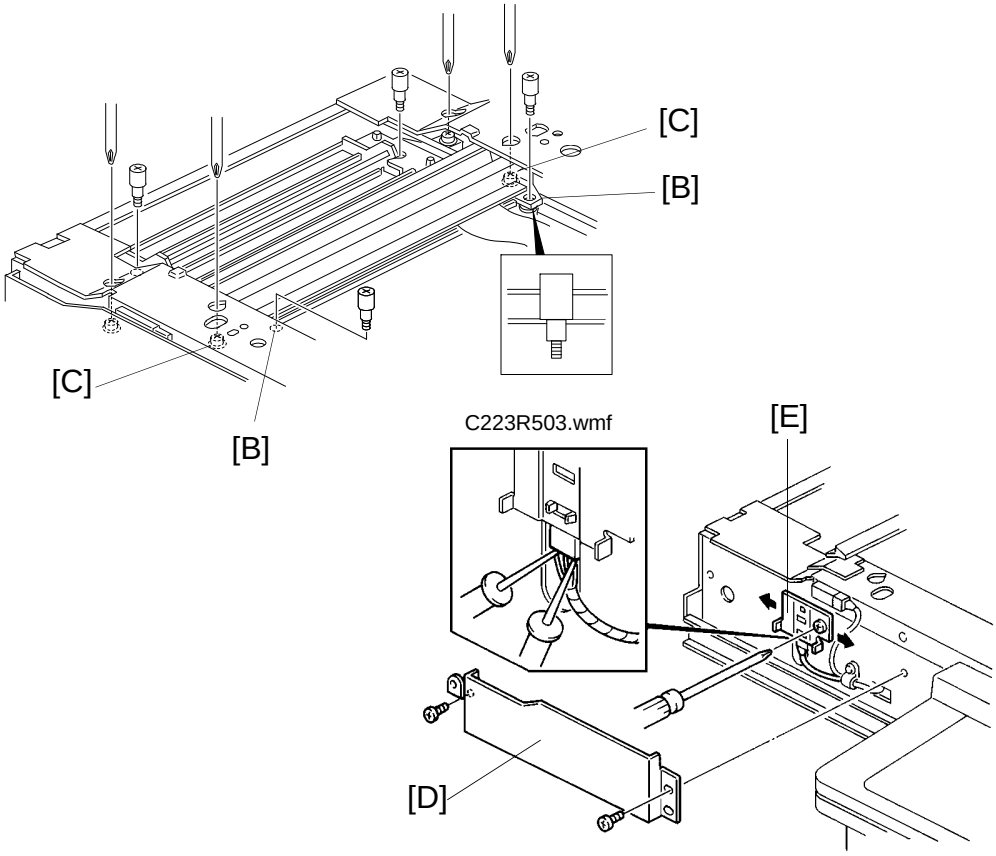
2.1 SCANNER POSITION ADJUSTMENT



C223R501.img

Purpose: To make the position of the first and second scanners parallel with the scan line position, and to make the scanners stop at the correct home position.

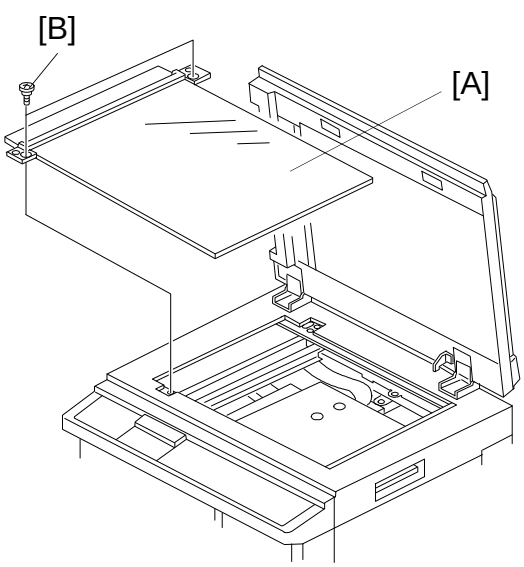
1. Restart the machine with the main switch, so that the scanners move to the home position. Then, enter the scanner home position check mode (Input check mode: SP130-45).
2. Remove two positioning pins [A] that are located in the right side of the scanner.



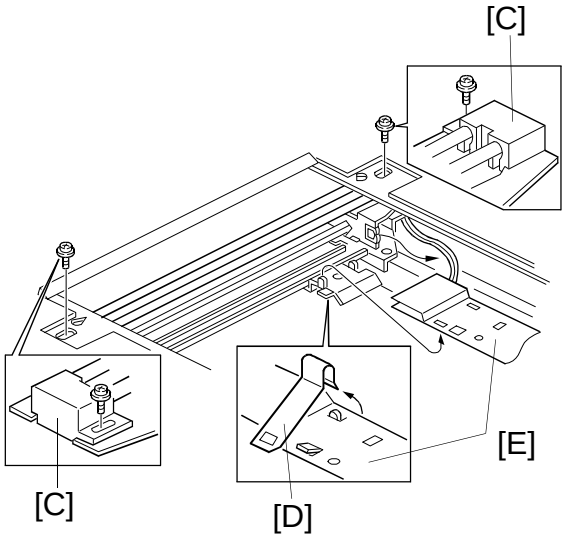
C223R502.img

3. Put the positioning pins in the front and rear openings [B] in the first scanner. Make sure that the positioning pins can be fit into the holes smoothly.
4. If the pins did not fit smoothly, adjust the position of the first scanner with the screws [C].
5. Check and adjust the position of the second scanner using the same procedure as in steps 3 and 4.
6. Slide the scanner unit and remove the sensor cover [D] (2 screws).
7. Connect the probes of a multimeter to the sensor's connector.
   CN1: +5V
   CN2: GND
   CN3: Scanner H.P (Signal)
8. Slide the sensor bracket [E] and tighten the bracket when the sensor output goes to low (5 V to 0 V).
9. Check the optics adjustments and adjust them if necessary (see Removal and Adjustment: Optics).

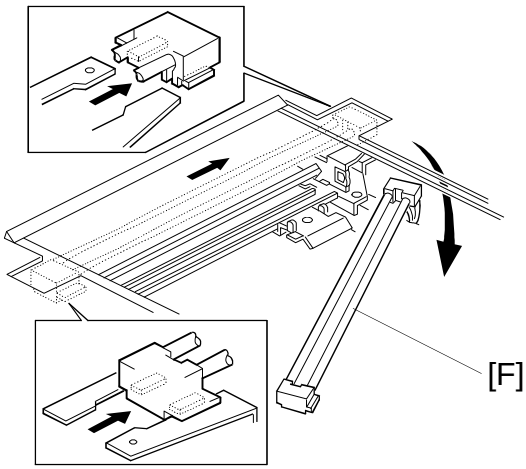
2.2 EXPOSURE LAMP REPLACEMENT



C223R504.wmf



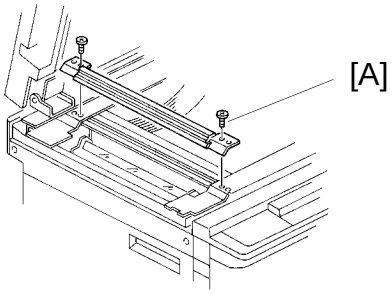
C223R506.wmf



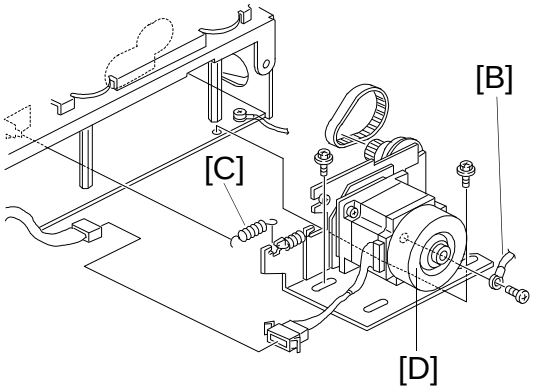
C223R505.wmf

1. Remove the exposure glass [A] (2 screws [B]).
2. Remove the screws that hold the front and rear xenon lamp terminals [C] (2 screws each).
3. Remove the plate [D] that holds the cable protection sheet [E].
4. Remove the cable protection sheet.
5. Remove the lens block cover (7 screws).
6. Remove the clamper (1 screw) holding the lamp harness.
7. Disconnect the lamp cable connectors from the lamp stabilizer.
8. Slide the xenon lamp [F] to the rear side and remove it.

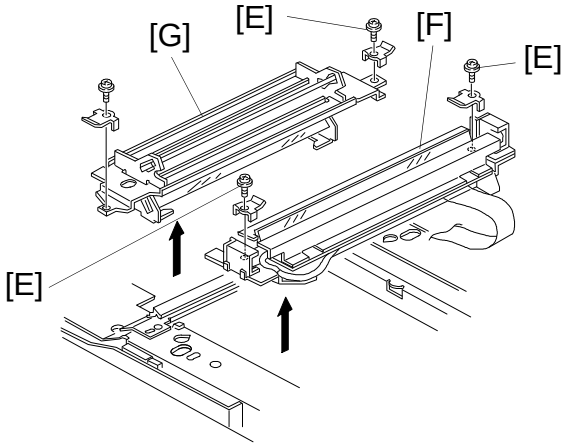
2.3 SCANNER TIMING BELTS



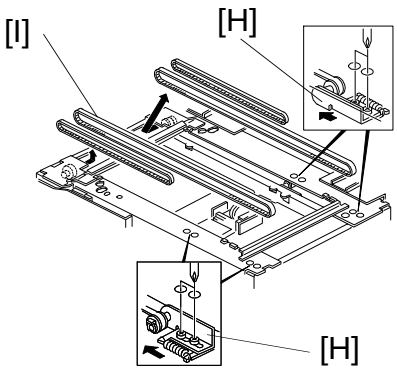
C223R507.img



C223R508.wmf



C223R509.wmf



C223R510.wmf

Replacement Adjustment

1. Remove the exposure glass (see Exterior Cover Removal).
2. Remove the upper cover (see Exterior Cover Removal).
3. Remove the exit guide [A] (2 screws).
4. Remove the upper rear cover (see Exterior Cover Removal).
5. Remove the grounding wire [B] (1 screw).
6. Remove the spring [C].
7. Remove the scanner motor assembly [D] (2 screws, 1 connector, 1 timing belt).
8. Loosen the screws [E] securing both the 1st scanner [F] and 2nd scanner [G]. Then take out these scanners.
9. Loosen the screws securing the belt tension brackets [H].
10. Remove the timing belts [I].

NOTE: After replacing the scanners, the scanner position adjustment must be performed (see section 2-1).

3. OPTICS

3.1 OVERVIEW

Double-check all optical component adjustments, because these adjustments influence each other.

The following table shows the reciprocal relationship between adjustment procedures. A "O" indicates those items that must be checked (check items) after an item in the left column (adjustment item) is adjusted.

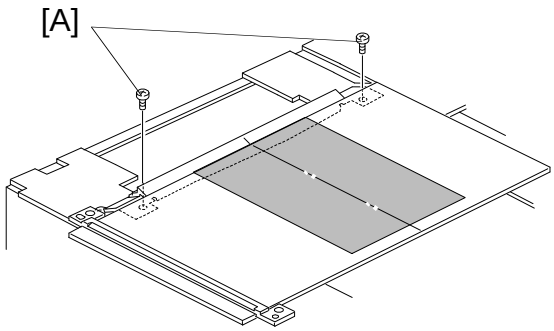
Check Item / Adjustment Item	Black Level	White Level	Shading	Scan Line Position	Reading Start Position	Focus (MTF)	Reduction Ratio (Moire)
Black Level		O					
White Level	O						
Shading	O	O					
Scan Line Position		O	O		O		
Reading Position		O	O	O			
Focus (MTF)							O
Reduction Ratio (Moire)	O	O	O	O	O	O	

Necessary Tools

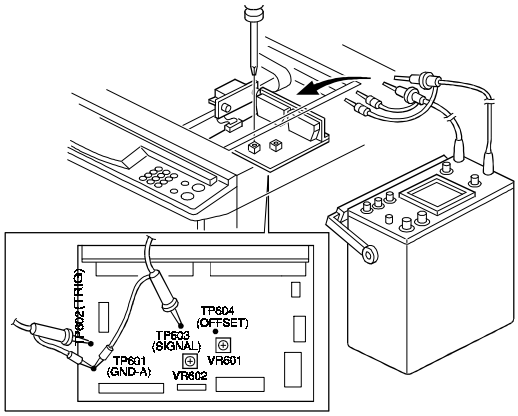
1) Facsimile Test Chart R-21 (P/N 99992131)
2) Resolution Chart (P/N A0129110)
3) Oscilloscope

Oscillo-scope	Test Pin
CH1	TP603 (SIGNAL)
CH2	TP604 (OFFSET)
	TP602 (TRIG)
GND	TP601 (GND-A)

CH2 should be connected to TP604 when the black level is adjusted. For all other adjustments, CH2 should be connected to TP602.



C223R511-1.wmf

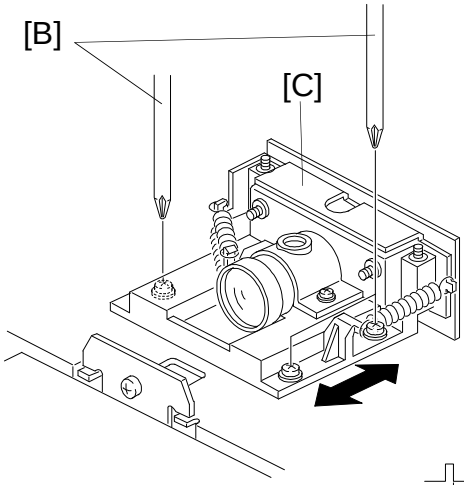


C223R512.wmf

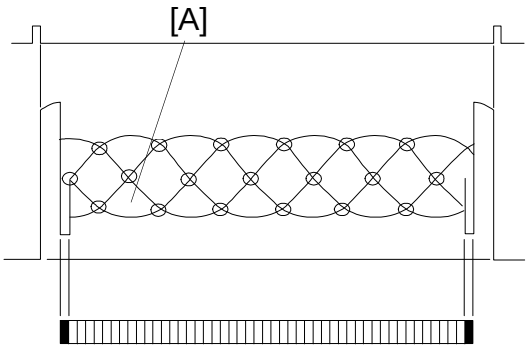
3.2 PREPARATION FOR ADJUSTMENT

1. Remove the upper cover.
2. Remove the lens block cover.
3. Connect CH1 of the oscilloscope to TP603, and CH2 to TP602 (A/D conversion board). Connect both ground terminals to TP601.
4. Remove the screws [A] then take off the exposure glass, rotate it 90 degrees, and position it across the top of the machine as shown above.
5. Turn the main switch on and access SP mode. Select Output check mode (SP131) No. 21.

3.3 REDUCTION RATIO ADJUSTMENT (MOIRE ADJUSTMENT)



C223R513.wmf



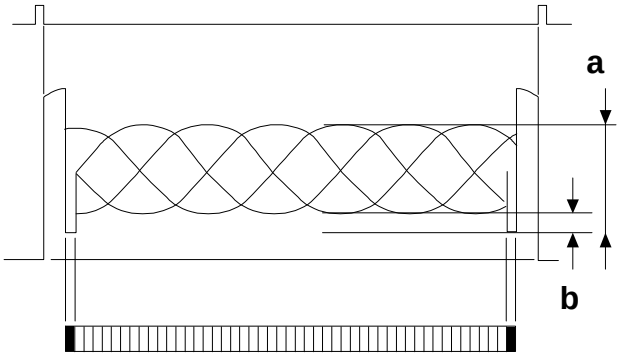
C223R514.wmf

Purpose: To adjust the magnification ratio in the main scan direction (to set the distance between the lens and the original).

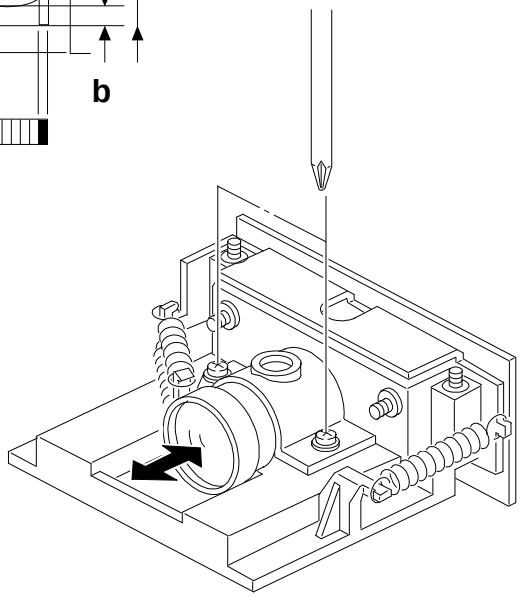
Adjustment Standard: There must be 30 crosspoints [A] or fewer.

1. Position the resolution chart so that the area containing the 200 dpi pattern on the test chart can be read.
2. Press the Print Start key to turn on the xenon lamp.
3. At the same time, check if the waveform looks like the one in the illustration above.
4. If it does not, loosen the mounting screws [B] and adjust the position of the lens block [C] as indicated by the arrows.
5. After the adjustment, retighten the mounting screws [B].

3.4 FOCUS ADJUSTMENT (MTF ADJUSTMENT)



C223R516.wmf



C223R515.wmf

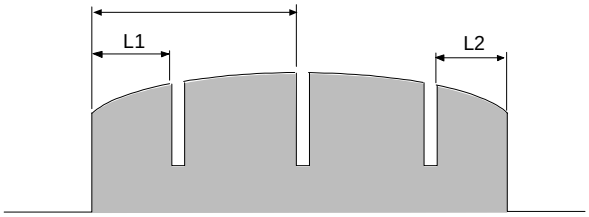
Purpose: To adjust the focus distance between the CCD and the lens.

Adjustment Standard: a–b/a+b x 100 ≥ 60%

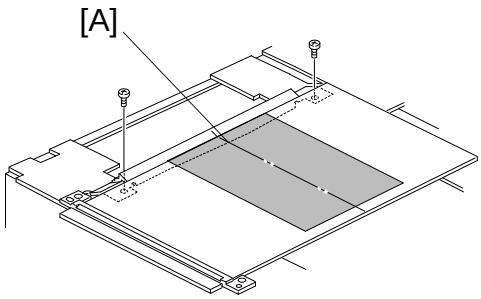
1. Position the resolution chart so that the 200 dpi area on the test chart can be read.
2. Press the Print Start key to turn on the xenon lamp.
3. Check if the waveform looks like the one you see in the illustration above.
4. Loosen the screw [A] and adjust the position of the lens [B] so that the length (a–b) reaches its maximum by moving it as shown by the arrow.
5. After the adjustment, retighten the screw [A].

3.5 READING START POSITION IN THE MAIN SCAN DIRECTION ADJUSTMENT

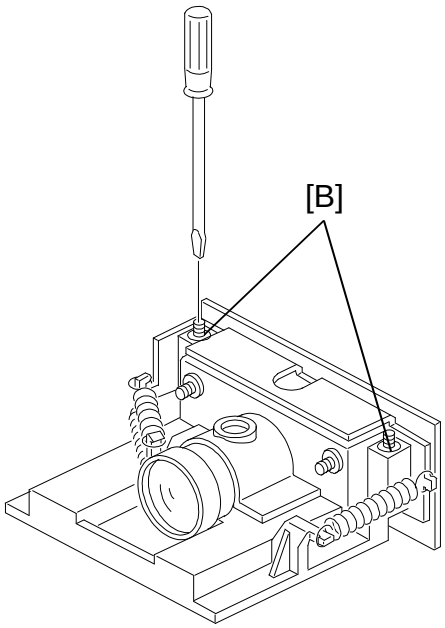
974.4 ± 3.2 µs



C223R543.wmf



C223R511-2.wmf



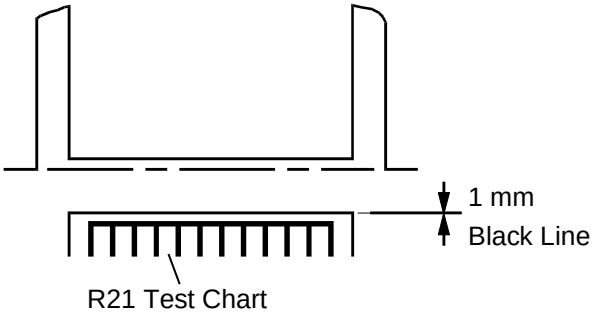
C223R518.wmf

Purpose: To align the center of the original with the center of the CCD. This will center the image on the master.

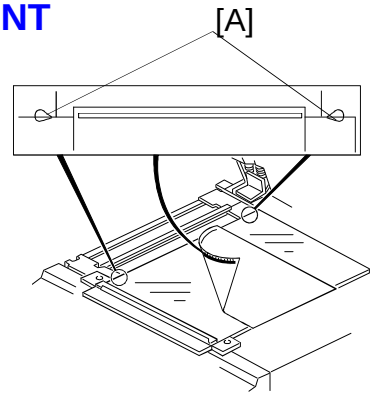
Adjustment Standard: The difference between L1 and L2 is less than 6 µs.

1. Position the R-21 test chart so that the center line, located at the leading edge of the test chart, is positioned at the center mark [A] on the exit guide.
2. Press the Print Start key to turn on the xenon lamp.
3. Check if the waveform looks like the one you see in the illustration.
4. If it does not, adjust the CCD position by turning the screws [B] until waveform is as shown in the diagram.

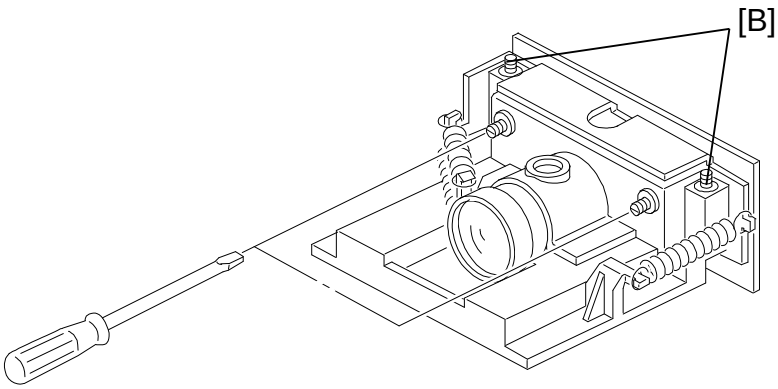
3.6 SCAN LINE POSITION ADJUSTMENT



C223R519.wmf



C223R593.wmf



C223R520.wmf

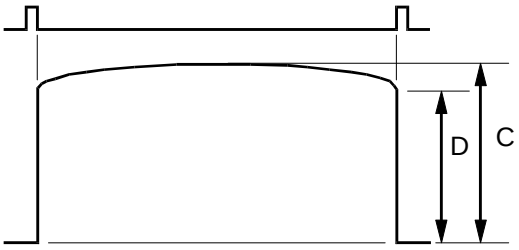
Replacement Adjustment

Purpose: To ensure that the CCD alignment is perpendicular to the original feed direction.

Adjustment Standard: See the above illustration.

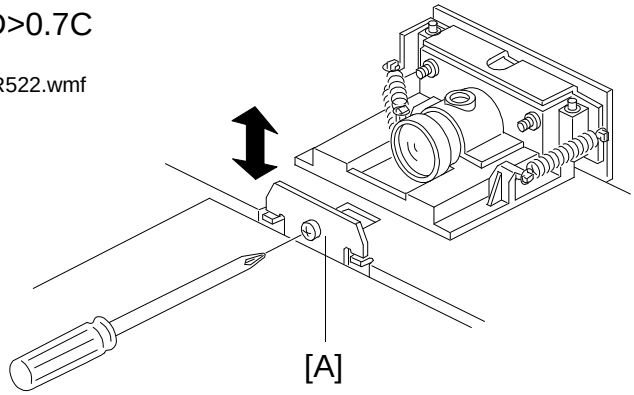
1. Position the exposure glass so that the edge of the glass is placed across the center of the holes [A] and place the black line of the test chart just at the edge of the glass as shown in the above diagram.
2. Press the Print Start key to turn on the xenon lamp and confirm that the waveform looks like the one in the above illustration.
3. If it does not, adjust the CCD board position by turning the screws [B] so that the shape of the wave is similar to that shown in the above diagram.

3.7 SHADING PLATE ADJUSTMENT



D>0.7C

C223R522.wmf



C223R523.wmf

- The middle of the waveform should be higher than the ends.

Purpose: To correct light intensity distortion properly.

Adjustment Standard: See the above illustration.

1. Position the resolution chart so that the white area can be read.
2. Press the Print Start key to turn on the xenon lamp.
3. Confirm that the above white level waveform is displayed.
4. If it is not, move the shading plate [A] vertically (up or down) until the waveform matches the one in the above diagram.

3.8 WHITE LEVEL AND BLACK LEVEL ADJUSTMENT

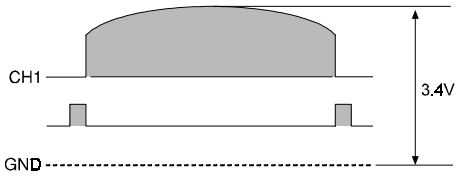


Fig. 1

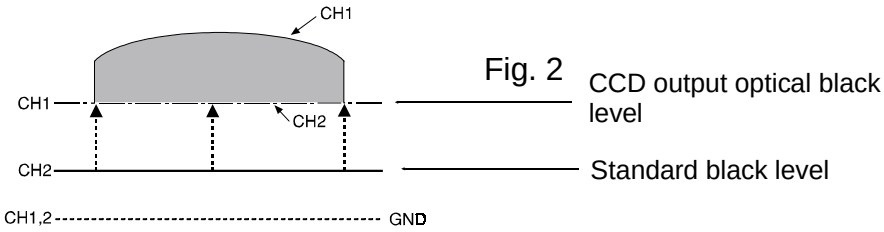


Fig. 2

C223R524.wmf

Purpose: To reproduce the correct original image density.

1. Position the resolution chart so that the white area can be read.
2. Press the Print Start key to turn the xenon lamp on.
3. Adjust VR601 on the A/D conversion board so that the maximum level is 3.4 ± 0.1 V (see Fig. 1).
4. Connect CH2 of the oscilloscope to TP604.
5. Check the standard black level at TP604. It should be the same as the optical black level of the CCD output. If it is not, adjust the standard black level by turning VR602 (see Fig. 2).

   NOTE: 1. When adjusting the standard black level, the GND level of CH1 and CH2 should be the same.
   2. If the standard black level is changed, the white level also changes. Readjust the white level after adjusting the black level.

3.9 MAIN-SCAN IMAGE POSITION ADJUSTMENT (PLATEN MODE)

Purpose: Adjust the master making start position to match the original center to the print image center.

1. Access the SP mode and select "1" in SP39.
2. Enter the desired value for the image position in the main-scan direction using the number keys. It can be changed to any value from –4.9 mm to +4.9 mm in 0.1 mm steps.
3. Press the Enter key to store the setting. Then leave the SP mode.
4. Make a new master and check the image position in the main scan direction.

3.10 SUB-SCAN IMAGE MAGNIFICATION ADJUSTMENT (PLATEN MODE)

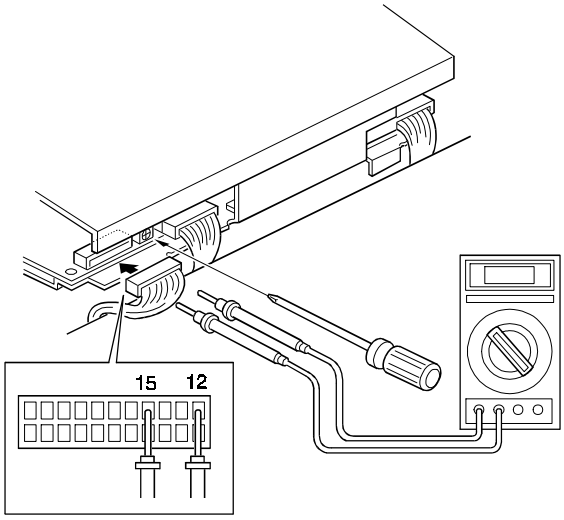
Purpose: Adjust the scanner motor speed to fix the original image length to the print image length.

Adjustment Standard: 100 ± 0.5%

1. Access the SP mode and select SP No. 30.
2. Change the magnification in the sub-scan direction using the number keys. It can be changed to any value from –1.9% to +1.9% in 0.1 % steps.
3. Press the Enter key to store the setting. Then leave the SP mode.
4. Make a new master and check the image magnification.

4. MASTER FEED

4.1 THERMAL HEAD VOLTAGE ADJUSTMENT



C223R527.wmf

Purpose: To maintain quality when making masters and to extend the lifetime of the thermal head.

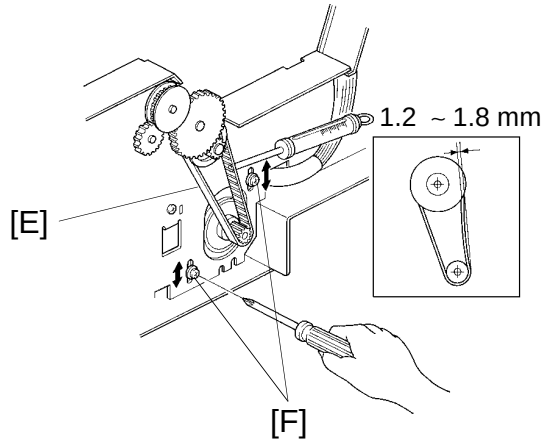
Adjustment Standard:

Refer to the voltage value (X) on the thermal head decal. The adjustment voltage should be between "X-0.1" and "X".

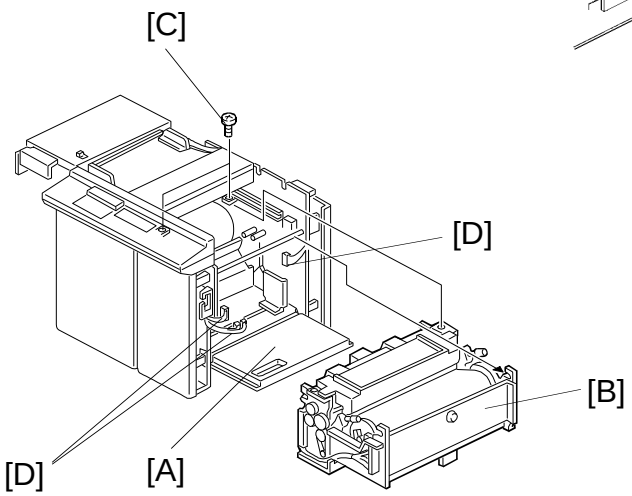
NOTE: This adjustment is always required when the thermal head or power supply unit is replaced.

1. Turn off the main switch and remove the paper exit cover plate (4 screws).
2. Check the voltage on the thermal head decal. (The voltage is different for each thermal head.)
3. Turn on the main switch.
4. Access the SP mode and select output check mode (SP131) No. 41.
5. Press the Print Start key to apply thermal head voltage continuously (60 seconds).
6. Check the voltage between CN503-15 and CN503-12. If the voltage is out of standard, turn VR1 on the power supply board to adjust the voltage.

4.2 BELT TENSION ADJUSTMENT



C223R594.img



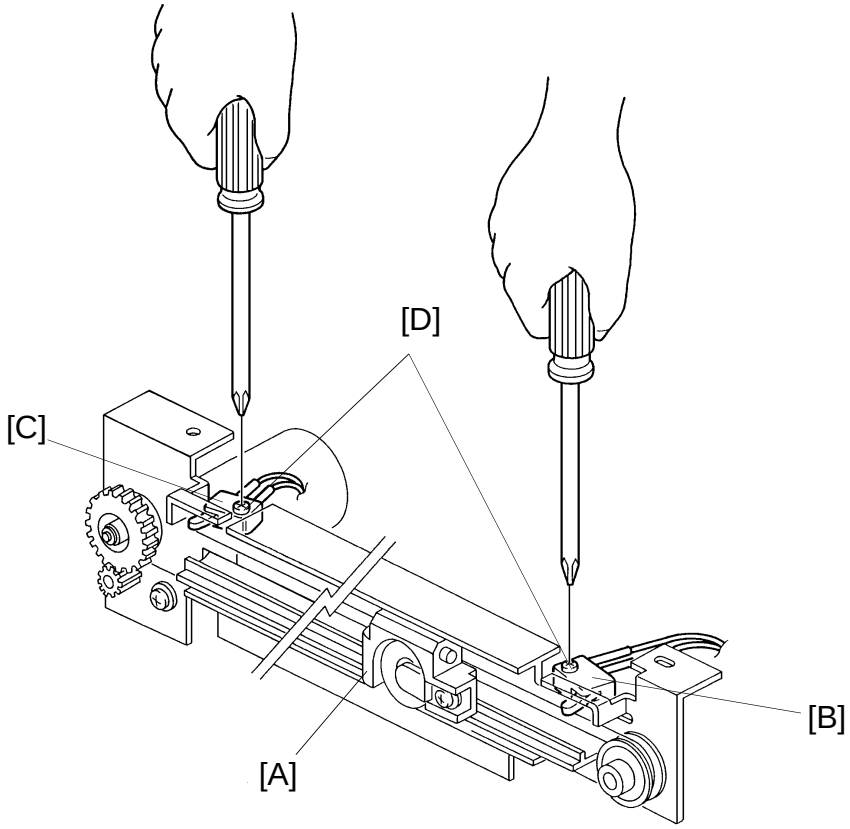
C223R605.wmf

Purpose: To ensure that proper rotation for the master feed is transmitted to each roller.

Adjustment Standard: 1.2 to 1.8 mm

1. Lower the paper table [A].
2. Remove the master making unit cover (5 screws).
3. Remove the front and rear grounding plates of the master making unit (2 screws each).
4. Remove the bracket (2 screws) covering the scanner unit safety switch harness.
5. Remove the master making unit [B] (2 screws [C] and 4 connectors [D]).
6. Using a tension gauge, apply a 110-gram load to the center of the belt [E]. Make sure that the belt deflects 1.2 to 1.8 mm.
7. If it does not, adjust the master feed motor position (2 screws [F]).

4.3 RIGHT AND LEFT CUTTER SWITCHES ADJUSTMENT



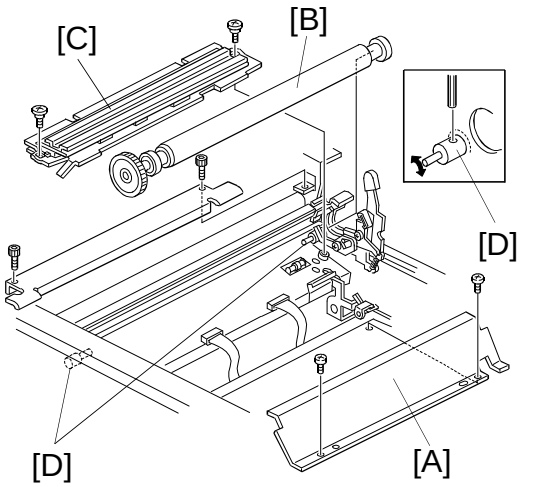
C223R606.img

Purpose: To ensure that the cutter slider stops properly.

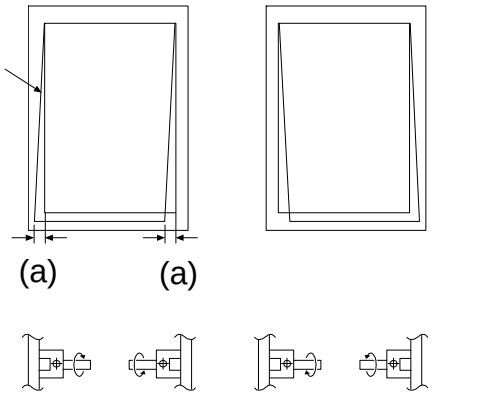
Adjustment Standard: Confirm that the cutter holder activates the switches.

1. Remove the cutter unit. (See Cutter Unit Removal.)
2. After moving the cutter holder [A] fully to the left, make sure that the left cutter switch [B] is turned on. Make sure that the right cutter switch [C] is also turned on when the cutter is moved fully to the right.
3. If not, loosen the mounting screws [D] and adjust the switch position.

4.4 THERMAL HEAD ALIGNMENT ADJUSTMENT



C223R613.wmf]



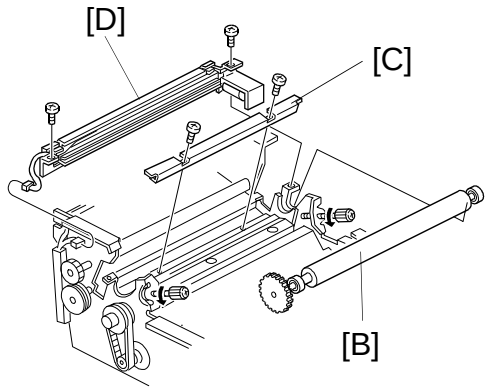
C223R614.wmf

Purpose: To make sure that the original image is correctly reproduced without skew.

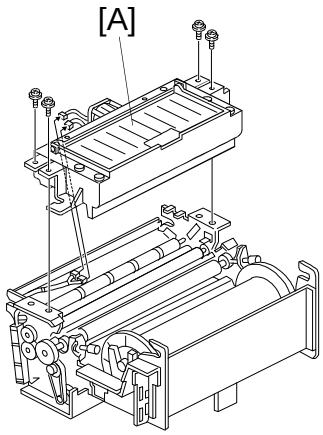
1. Remove the master box, thermal head cover [A] (2 screws), platen roller gear cover (1 screw), platen roller [B], and the thermal head [C] (2 screws).
2. Loosen the Allen screws securing the front and rear thermal head positioning pins [D].
3. Turn the front or rear thermal head positioning pin. Then turn the other in the opposite direction in the same amount.

   NOTE: If the front and rear thermal head pins are turned through one unit on the scale printed above the pin, the image skew amount (a) is corrected by 0.3 mm.
4. Tighten the Allen screws and reassemble the machine.
5. Make a new master and check if the image skew is corrected.

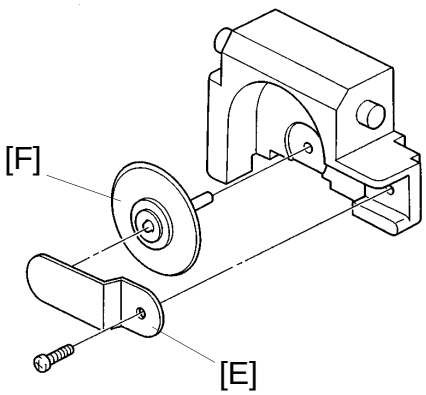
4.5 CUTTER UNIT REMOVAL



C223R596.wmf



C223R597.wmf



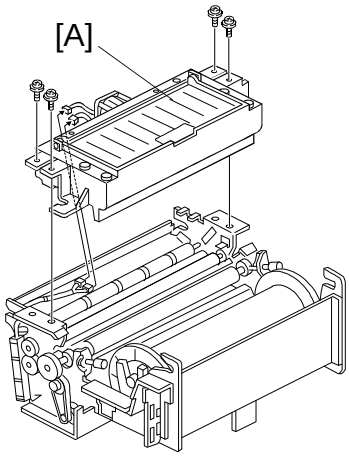
C223R604.img

NOTE: Be careful not to damage the thermal head.

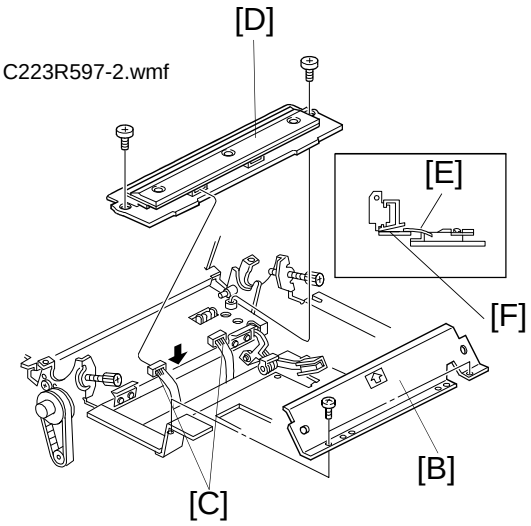
1. Lower the paper table.
2. Remove the master making unit. (See Belt Tension Adjustment.)
3. Remove the master box [A] (4 screws).
4. Remove the platen roller [B] (2 knob screws).
5. Remove the thermal head guide plate [C] (2 screws).
6. Remove the cutter unit [D] (2 screws).
7. Remove the holder plate [E] (1 screw) and remove the cutter blade [F].

⚠WARNING:
Do not touch the edge of the cutter blade with bare hands.

4.6 THERMAL HEAD REMOVAL



C223R597-2.wmf

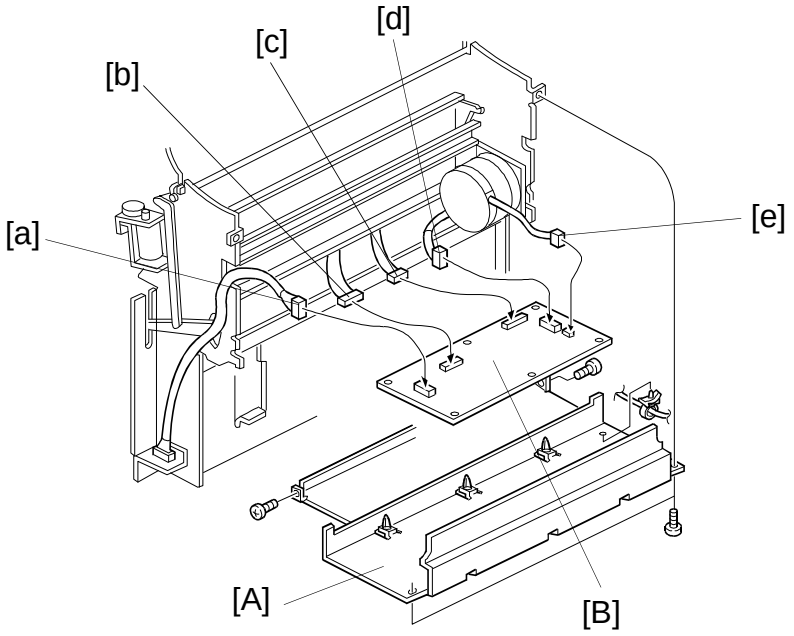


C223R598.wmf

1. Slide the scanner unit to the left.
2. Remove the master box [A] (4 screws).
3. Remove the platen roller and remove the master roll.
4. Remove the thermal head cover [B] (2 screws).
5. Disconnect the two thermal head connectors [C].
6. Remove the thermal head [D] (2 screws).

NOTE: 1. When replacing the thermal head, make sure the thermal head guide plate [E] is positioned above the lower cutter unit guide plate [F].
2. Make sure neither of the connectors are loose before reassembling the machine.

4.7 THERMAL HEAD DRIVE PCB REMOVAL

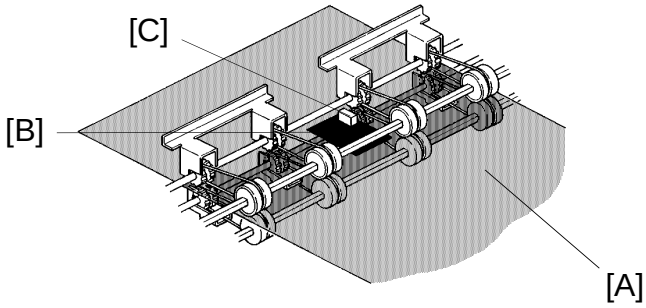


C223R599.wmf

1. Remove the master making unit.
2. Open the bottom plate [A] of the master making unit (2 screws).
3. Disconnect the 5 connectors (a to e).
4. Remove the thermal head drive PCB [B] (6 locking supports).

5. MASTER EJECT

5.1 MASTER EJECT SENSOR ADJUSTMENT



C223R528.img

Purpose: To ensure that the sensor [A] detects the ejected master.

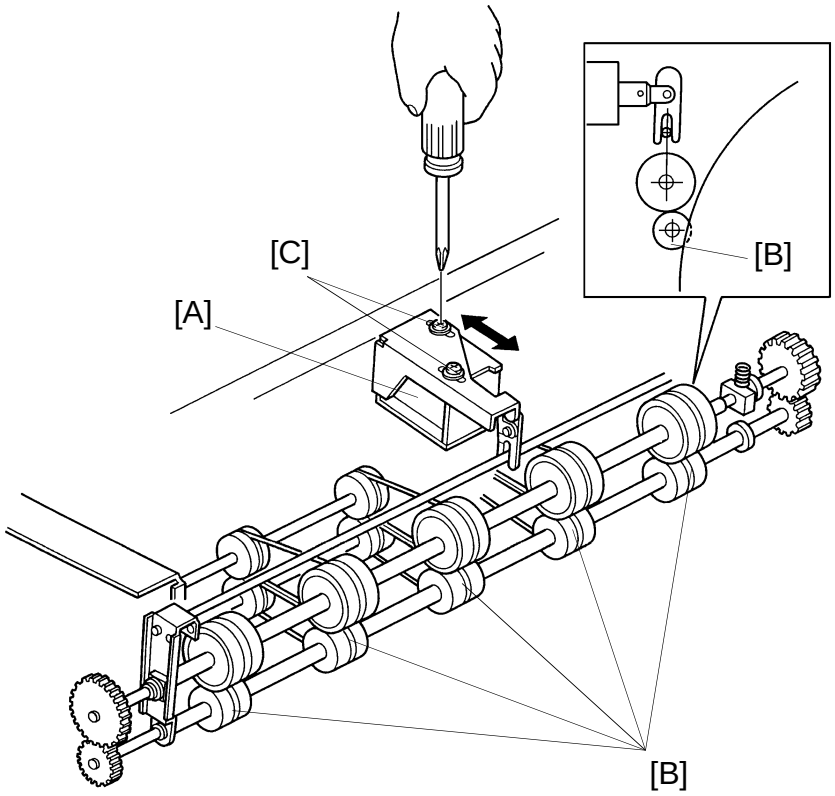
Adjustment Standard: 0.8 to 0.9 V when no master is detected.

1. Make a master that has a solid black area as follows. The solid black area should be about A7 size (74 x 105 mm/3" x 4"). Using a solid black test master ensures that the sensor is tested under the worst case condition.
   a. Put the original with the solid black area on the original table.
   b. Make some prints.
   c. Stop printing when the image density of the solid black area on the print stabilizes.
   d. Take out the drum unit and master eject box, and remove the master from the drum.

   NOTE: To prevent the thermal head from overheating, do not use a large solid black original.
2. Put back the drum unit and the master eject box.
3. Access SP mode and select SP No.137. Then press the Print Start key. The master eject sensor voltage is displayed.

   NOTE: The voltage can also be checked using TP104 (master eject sensor output) and TP107 (GND).
4. Confirm that the voltage is 0.8 to 0.9 V when the master is not under the master eject sensor.
5. If it is not, adjust it by turning VR104 on the main PCB.
6. After adjusting, insert the master [A] between the upper and the lower eject rollers with the master film side up and position the solid black area [B] under the sensor [C]. Then confirm that LED104 turns on.
   If the sensor does not respond, the sensor or the main PCB is defective, or the two components may be disconnected.

5.2 MASTER EJECT SOLENOID POSITION ADJUSTMENT



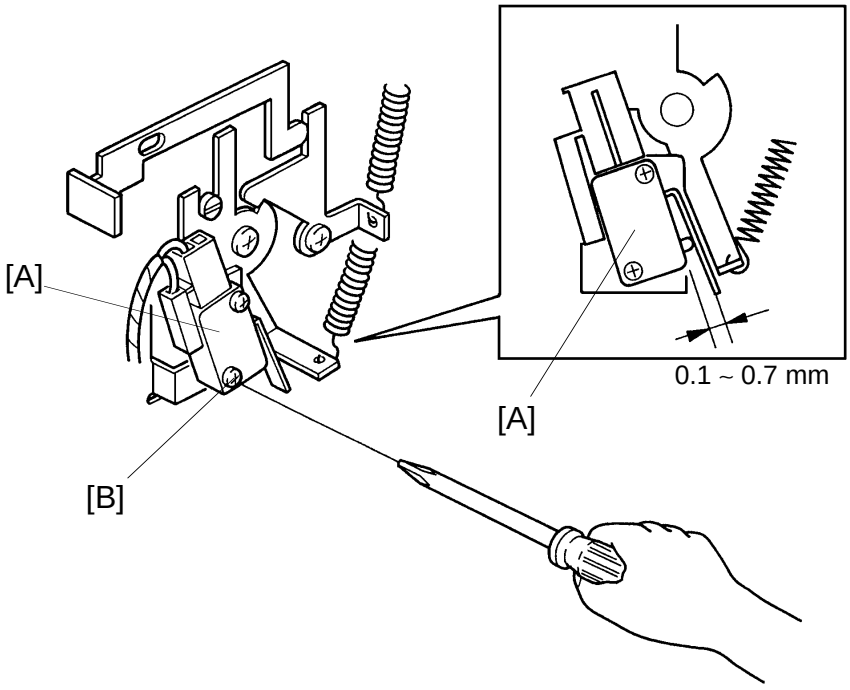
C223R529.img

Purpose: To ensure that the master is ejected.

1. Open the master eject unit and remove its upper cover (4 screws).
2. Make sure that the lower rollers [B] touch the drum surface when the solenoid [A] is on, and that they do not touch when the solenoid is off. To energize the solenoid, use output check mode (SP131) No.17.
3. If the rollers are not adjusted correctly, loosen the screws [C] and adjust the mounting position of the master eject solenoid [A].
4. After adjusting, retighten the screws [C].

   NOTE: To check if the lower roller touches the drum surface, wrap the drum with blank paper. Then check the paper for roller marks.

5.3 AIR KNIFE MOTOR SAFETY SWITCH ADJUSTMENT



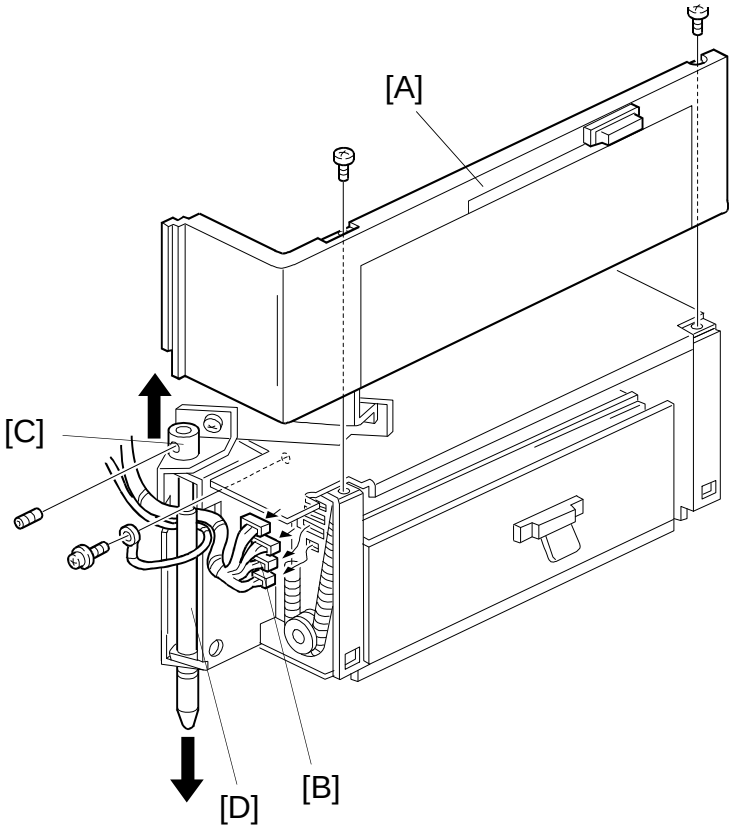
C223R530.img

Purpose: To ensure that the safety switch turns on and stops the air knife motor when the master eject unit is opened.

Adjustment Standard: 0.1 to 0.7 mm

1. Open the front door, then remove the right front cover and inner cover.
2. Confirm that the safety switch [A] turns off when you open the master eject unit.
3. Confirm that the distance between the safety switch and the actuator is 0.1 ~ 0.7 mm when the master eject unit is closed.
4. If it is not, loosen the screw [B] and adjust the position of the switch [A].
5. After adjusting, tighten the screw [B] and check the function of the safety switch again.

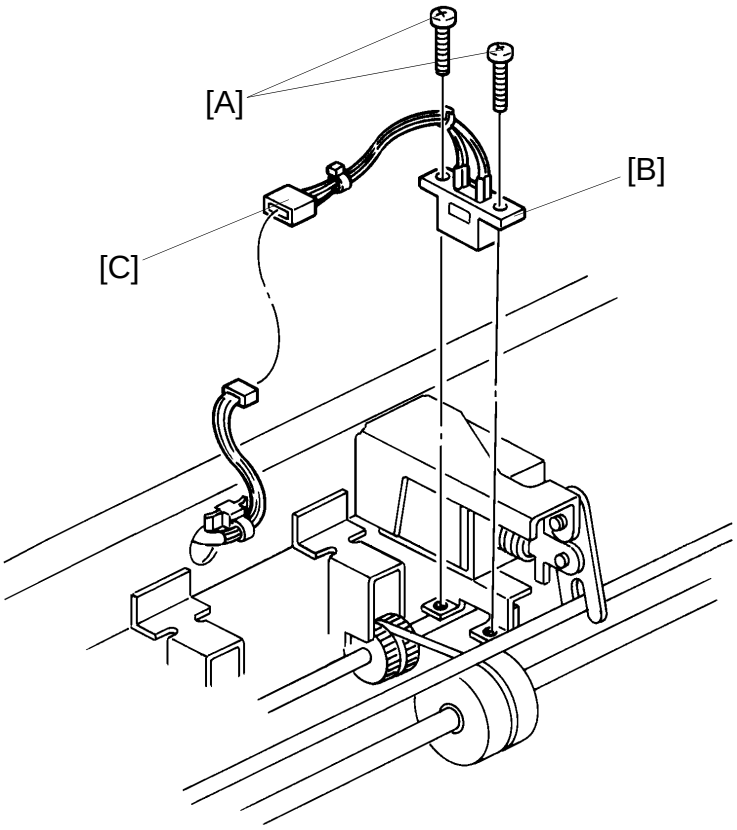
5.4 MASTER EJECT UNIT REMOVAL



C223R531.img

1. Remove the rear cover (7 screws).
2. Remove the master eject unit cover [A] (2 screws).
3. Disconnect the 4 connectors [B].
4. Remove the guide shaft stopper [C] (1 Allen screw).
5. While supporting the master eject unit, slide out the guide shaft [D].
   NOTE: Be careful not to drop the master eject unit.

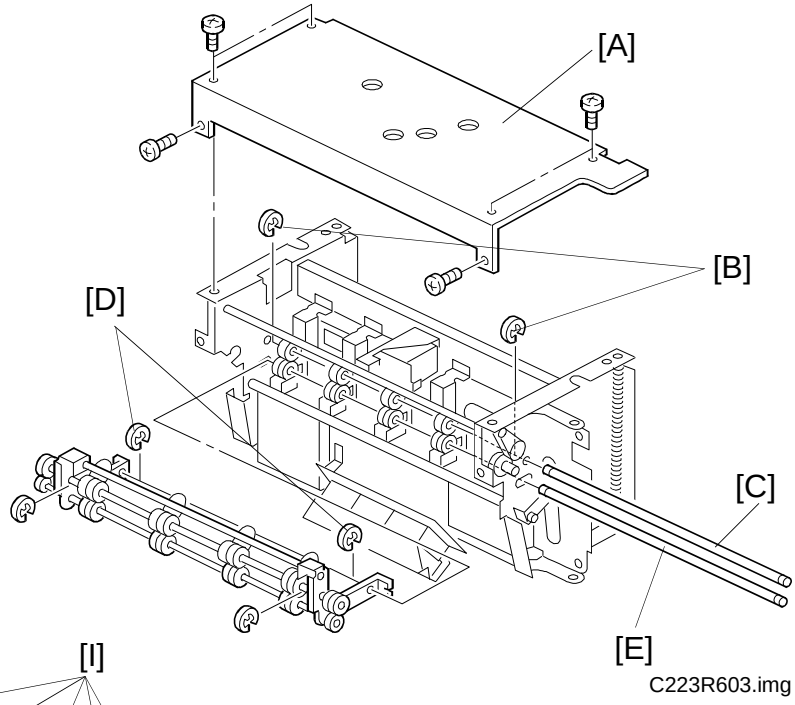
5.5 MASTER EJECT SENSOR REMOVAL



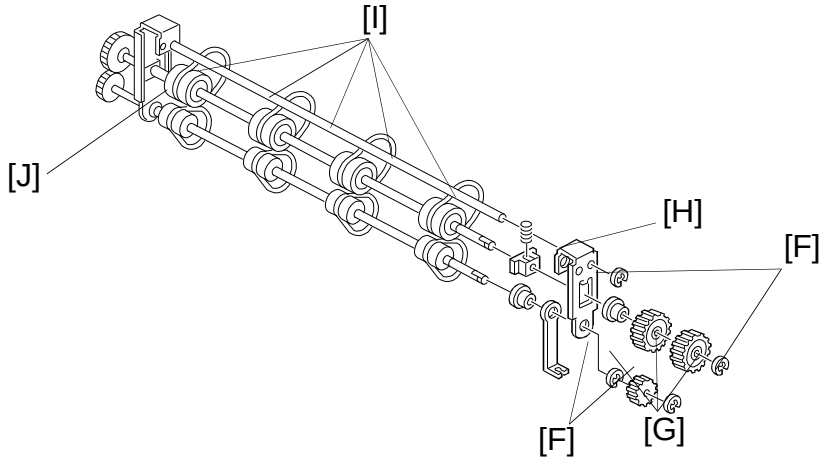
C223R532.img

1. Remove the master eject unit.
2. Remove the upper master eject unit cover.
3. Remove the 2 screws [A].
4. Disconnect the connector [C] and remove the master eject sensor [B].

5.6 MASTER EJECT BELTS/ROLLERS REMOVAL



C223R603.img

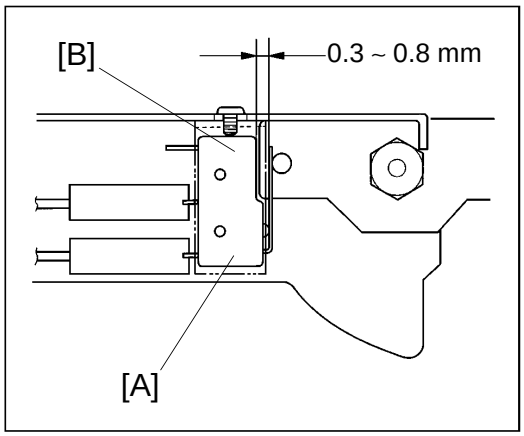


C223R602.img

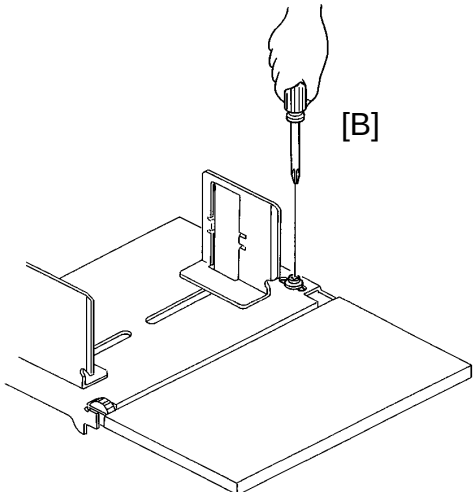
1. Remove the master eject unit.
2. Remove the unit cover [A] (6 screws).
3. Remove the 2 E-rings [B] and remove the upper pulley shaft [C].
4. Remove the 2 E-rings [D], take out the shaft [E], and remove the roller unit from the master eject unit.
5. Remove the 4 E-rings [F] and 3 gears [G].
6. Remove the supporter [H].
7. Remove the 8 belts [I].
8. Remove the rubber rollers [J].

6. PAPER FEED

6.1 PAPER TABLE OPEN SWITCH ADJUSTMENT



C223R535.img



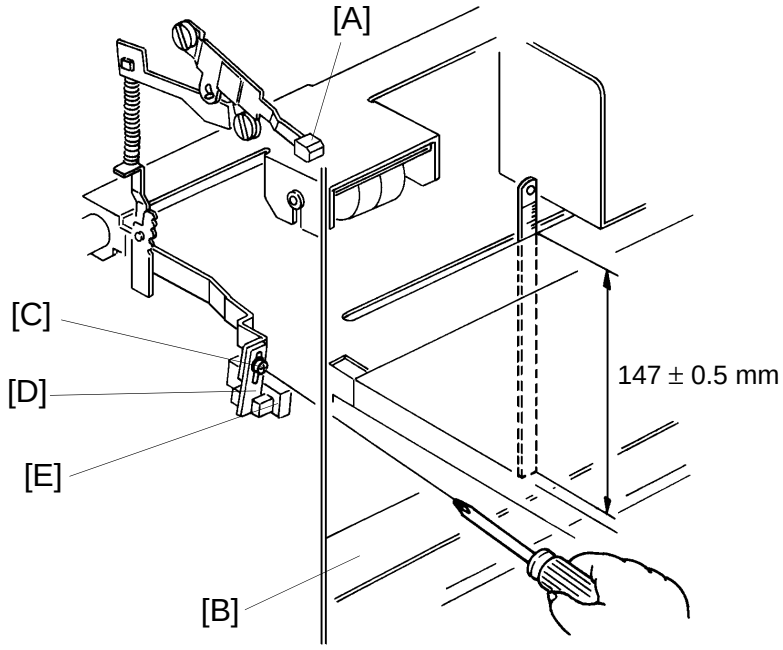
C223R536.img

Purpose: To ensure that the paper table open switch turns on to prevent the paper table from going up when the paper table is closed.

Adjustment Standard: 0.3 to 0.8 mm

1. Make sure that the switch [A] turns off when the paper table is opened and that it turns on when the paper table is closed.
2. If this is not the case, loosen the screw [B] and adjust the switch bracket position.
3. After adjustment, repeat step 1.

6.2 PAPER TABLE HEIGHT ADJUSTMENT



C223R537.img

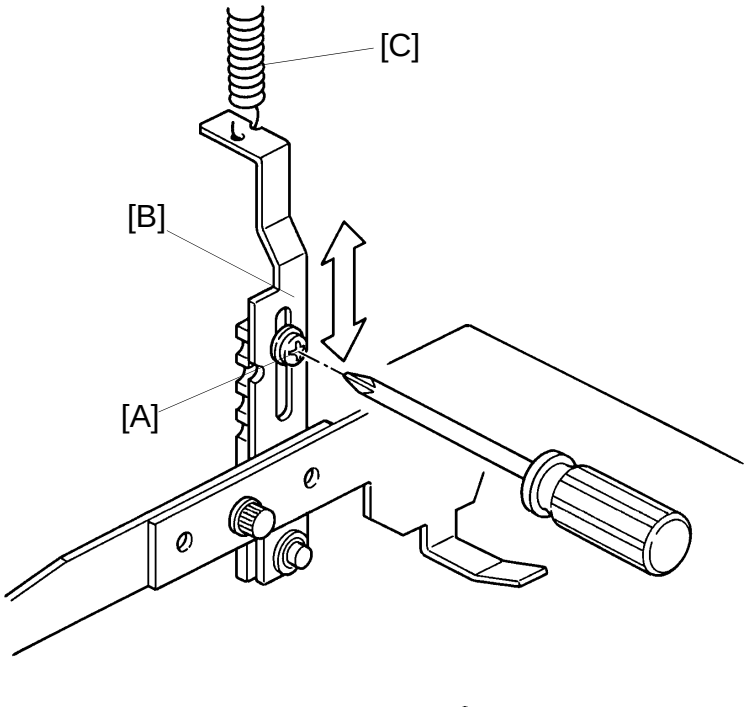
Purpose: To ensure smooth paper feed.

Adjustment Standard: 147 ± 0.5 mm

1. Set the paper feed pressure adjusting lever [A] to the upper position.
2. Remove the right cover of the machine (5 screws).
3. Turn on the main switch and access the service program mode.
4. Select output check mode (SP131) No. 19, and press the Print Start key to raise the table.
5. After the paper table stops, insert a scale into the slot at the end of the paper table. Make sure that the distance between the lower stay [B] and the upper face of the table is between 146.5 and 147.5 mm.
6. If it is not, loosen the screw [C] and adjust the position of the actuator [D].
7. After adjusting, repeat step 5 by lowering the paper table (use output No. 18) and raising the paper table (use output No. 19) several times, checking the height each time.

   NOTE: When mounting the actuator, make sure that the actuator [D] does not touch the paper table height sensor [E].

6.3 PAPER FEED ROLLER PRESSURE ADJUSTMENT



C223R610.img

Purpose: To ensure that the paper feed roller exerts sufficient pressure for a smooth paper feed (for a printing paper weight range of 50 g/m^2 to 215 g/m^2).

NOTE: 1. If paper isn't feeding properly or isn't feeding at all, follow procedure 1. If procedure 1 fails to correctly adjust the feed roller pressure, follow procedure 2 (next page).

2. After replacing the paper feed pressure spring [C], follow procedure 2 to adjust the roller pressure.

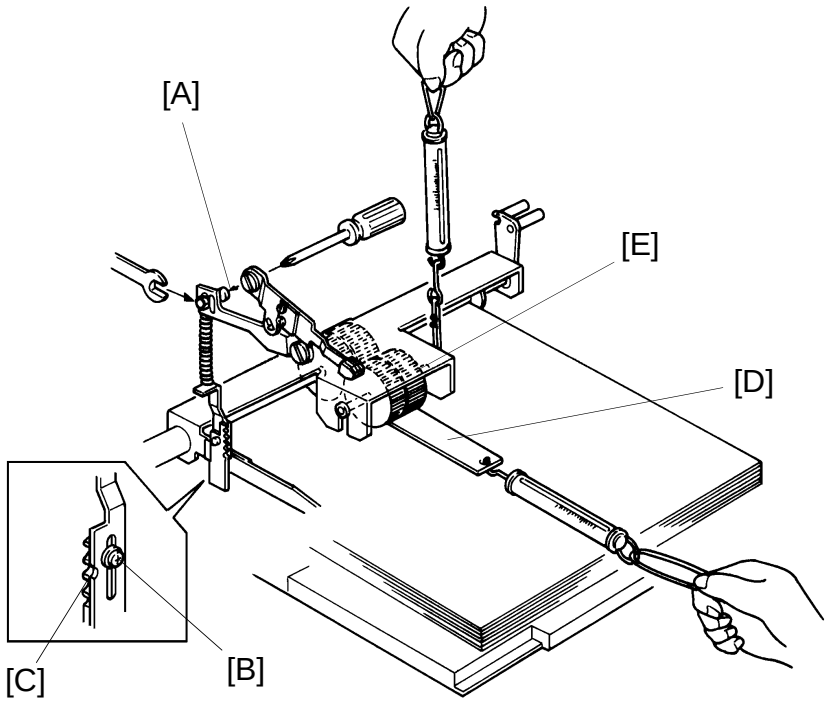
— Procedure 1 —

1. Loosen the screw [A] securing the lower adjustment plate [B].

   NOTE: When loosening the screw [A], hold the lower adjustment plate [B] in the original position for a fine adjustment.

2. Adjust the paper feed roller pressure by moving the lower adjustment plate [B] up or down.

   Up to increase the pressure
   Down to reduce the pressure



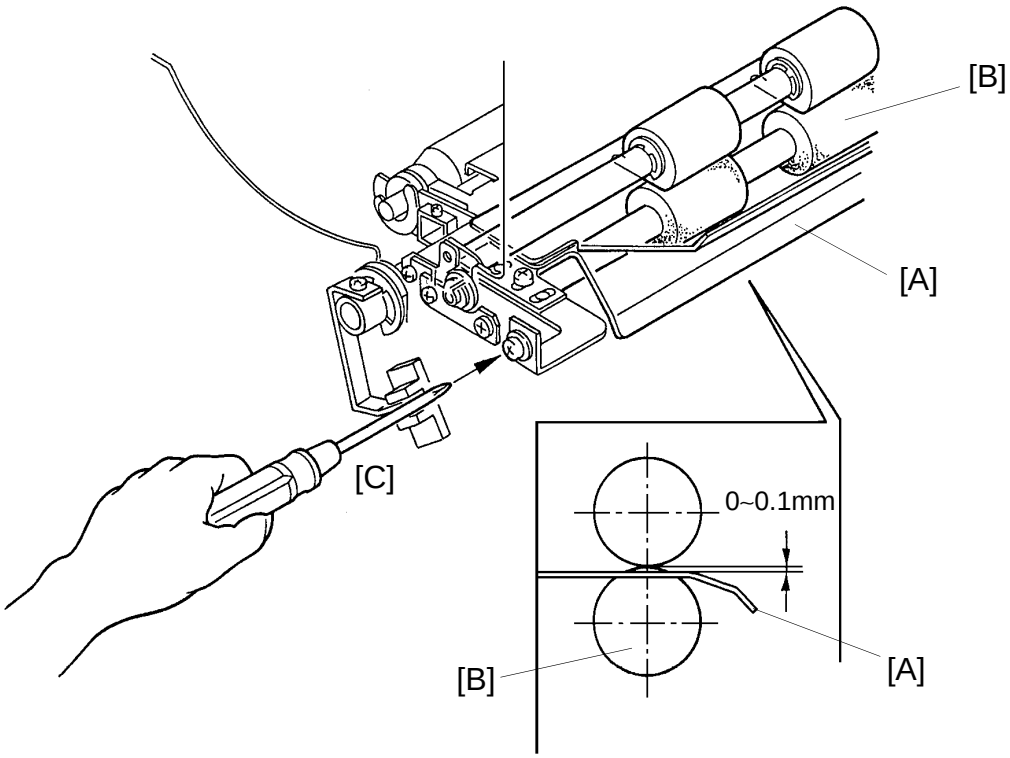
C223R611.img

— Procedure 2 —

This procedure should only be used when the proper pressure cannot be achieved with procedure 1.

1. Remove the master making unit.
2. Move the lever for adjusting the paper feed roller pressure to the upper position.
3. Remove the right front cover, main PCB, and image processing PCB.
4. Manually rotate the paper table drive gear to raise the paper table to the paper feed position. (The paper table height sensor is interrupted.)
5. Align the lower adjustment plate notch with the center notch of the link [C] and tighten the screw [B].
6. Hook a tension gauge (500-gram range) to the paper feed roller shaft [E]. Insert a strip of paper [D] between the paper feed roller and the sheets of paper. Then hook a tension gauge (100-gram range) to the paper strip and apply a 100-gram load. Now gradually pull up the tension gauge hooked to the shaft and make sure that the paper strip can be pulled out when the tension gauge shows 250 $\pm$ 5 grams.
7. If this is not the case, adjust the pressure by moving the mounting position of the shaft [A].

6.4 LOWER GUIDE PLATE ADJUSTMENT



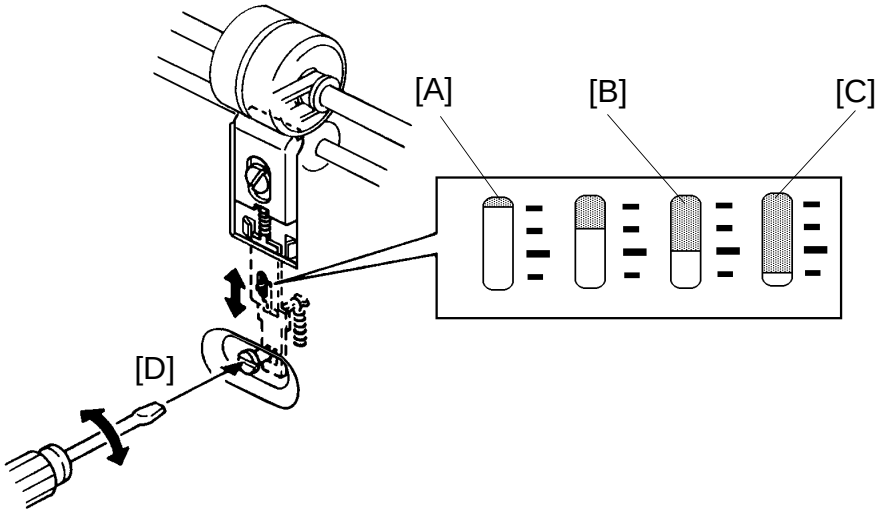
C223R517.img

Purpose: To ensure smooth paper feed, and to prevent paper jams, folding, and wrinkling.

Adjustment Standard: 0 to 0.1 mm

1. Make sure that the distance between the lower guide plate [A] and lower second feed roller [B] is between 0 and 0.1 mm as shown.
2. If it is not, remove both the front and rear covers and loosen the screw [C] (front and rear, one each). Then, adjust the position of the guide plate [A].
3. After adjustment, retighten the screw [C].

6.5 SEPARATION PLATE PRESSURE ADJUSTMENT



C223R540.img

[A]: Strong
[B]: Factory Setting
[C]: Weak

Purpose: To adjust the separation plate pressure to suit the type of paper being used by the customer.

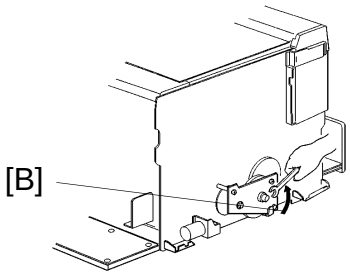
Adjustment Standard: See the above illustration.

1. Adjust the separation plate pressure by turning the adjustment screw [D].

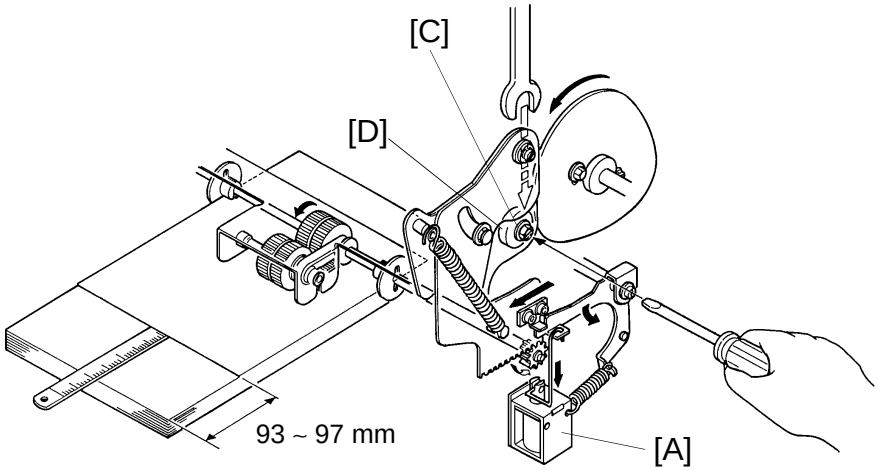
   NOTE: Position the groove on the screw head vertically ⊕ or horizontally ⊖ . Otherwise, vibrations may cause the screw to turn.

2. After adjusting, make some copies to check that the paper feeds smoothly without jamming, folding, or wrinkling. Use all the types of paper that the customer uses.

6.6 FEED LENGTH OF THE PAPER FEED ROLLER ADJUSTMENT



D223R541.img



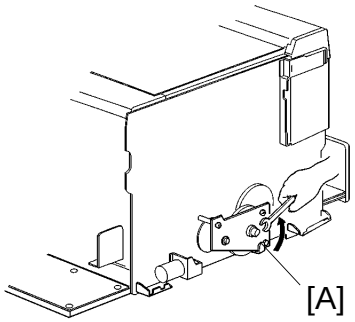
C223R542.img

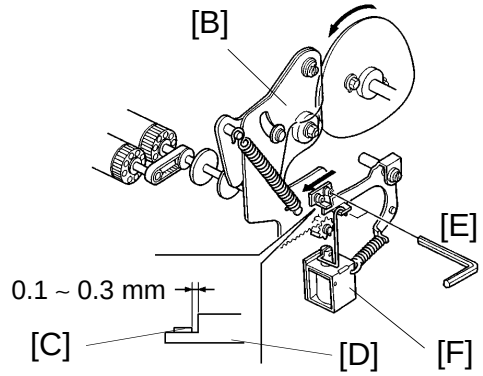
Purpose: To ensure paper feed to the second paper feed roller.

Adjustment Standard: 93 to 97 mm

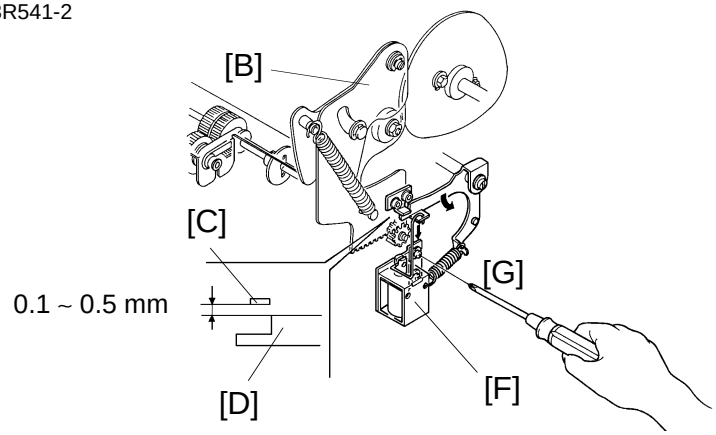
1. Stack about 100 sheets of paper on the paper table.
2. Set the lever for adjusting the paper feed roller pressure to the up position.
3. Remove the rear cover.
4. Turn on the paper feed solenoid [A] manually. Then, turn the rollers counterclockwise by rotating the shaft [B] with a 10 mm spanner.
5. Measure the length of paper fed. Measure from the time the paper feed roller starts rotating until it stops rotating. This feed length should be between 93 and 97 mm.
6. If it is not, adjust the feed length by loosening the hexagon nut [C] mounted on the sector gear. Then shift the bearing [D] up or down.
7. After adjusting, repeat steps 5 and 6.

6.7 PAPER FEED SECTOR GEAR STOPPER CLEARANCE ADJUSTMENT





C223R541-2



C223R544.img

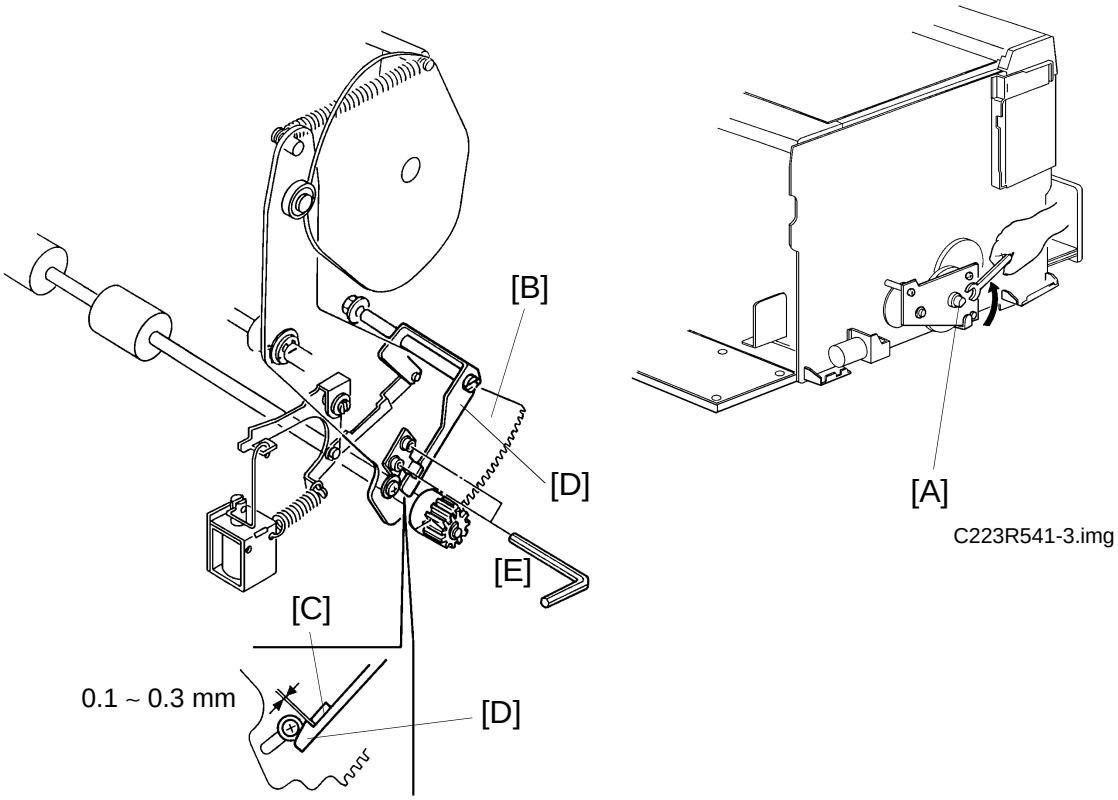
C223R545.img

Purpose: To ensure that the paper feed roller starts rotating when the paper feed solenoid turns on and stops rotating when the paper feed solenoid turns off.

Adjustment Standard: See the above illustrations.

1. Remove the rear cover.
2. With a 10 mm spanner, gradually turn the shaft [A] counterclockwise.
3. When the sector gear [B] fully turns clockwise, make sure that the clearance between the pin [C] and sector gear stopper [D] is between 0.1 and 0.3 mm.
4. If it is not, loosen the hexagon bolt [E] and adjust the clearance by shifting the sector gear stopper [D].
5. Push down the plunger of the paper feed solenoid [F] by hand. Make sure that the clearance between pin [C] and stopper [D] is between 0.1 and 0.5 mm.
6. If it is not, loosen the screw [G] and adjust it by shifting the bracket for the solenoid [F] up or down.

6.8 SECOND FEED ROLLER SECTOR GEAR STOPPER CLEARANCE ADJUSTMENT



C223R541-3.img

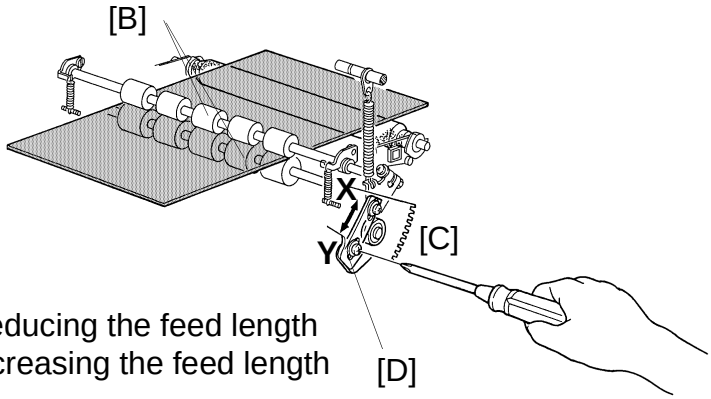
C223R547.img

Purpose: To ensure that the second feed roller starts rotating when the paper feed solenoid turns on and stops rotating when the paper feed solenoid turns off.

Adjustment Standard: 0.1 to 0.3 mm

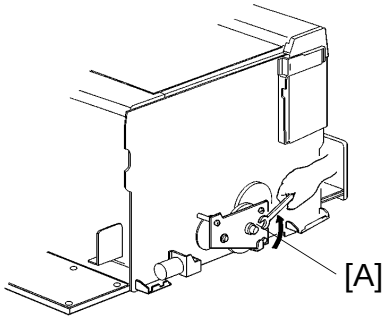
1. Remove the rear cover of the machine.
2. Gradually turn the drum rotation shaft [A] counterclockwise with a 10 mm spanner.
3. Turn the sector gear [B] counterclockwise until it stops. Make sure that the clearance between the pin [C] and the sector gear stopper [D] is between 0.1 and 0.3 mm.
4. If it is not, loosen the Allen screws [E] and adjust the clearance between the pin and the sector stopper.
5. Retighten the screws [E].

6.9 FEED LENGTH OF THE SECOND FEED ROLLER ADJUSTMENT

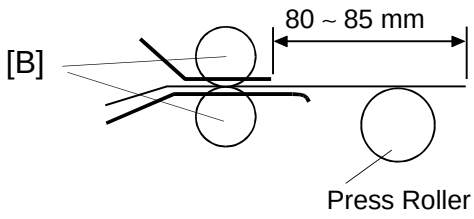


X: Reducing the feed length
Y: Increasing the feed length

C223R549.img



C223R541-4.img



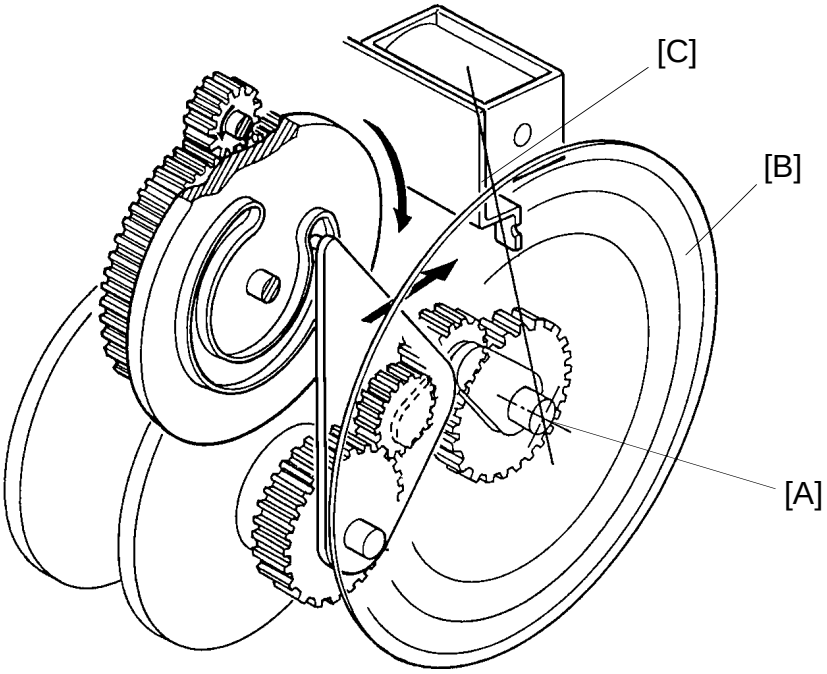
C223R548.img

Purpose: To ensure proper paper feed by the second feed rollers.

Adjustment Standard: 80 to 85 mm

1. Stack about 100 sheets of paper on the paper table.
2. Set the paper table in the paper feed position. (Use output check mode (SP131) No. 19.) Then, turn the main switch off and unplug the machine.
3. Remove the drum unit and the rear cover from the machine.
4. Turn on the paper feed solenoid manually. Then, gradually turn the drum rotation shaft [A] with a 10 mm spanner.
5. Measure the paper feed length from the time the second feed roller [B] starts rotating until it stops rotating. This feed length should be between 80 and 85 mm.
6. If it is not, adjust the feed length by loosening the screw [C] and by shifting the cam [D] up or down.
7. Check the adjustment by repeating steps 4 and 5.

6.10 SECOND FEED ROLLER START TIMING



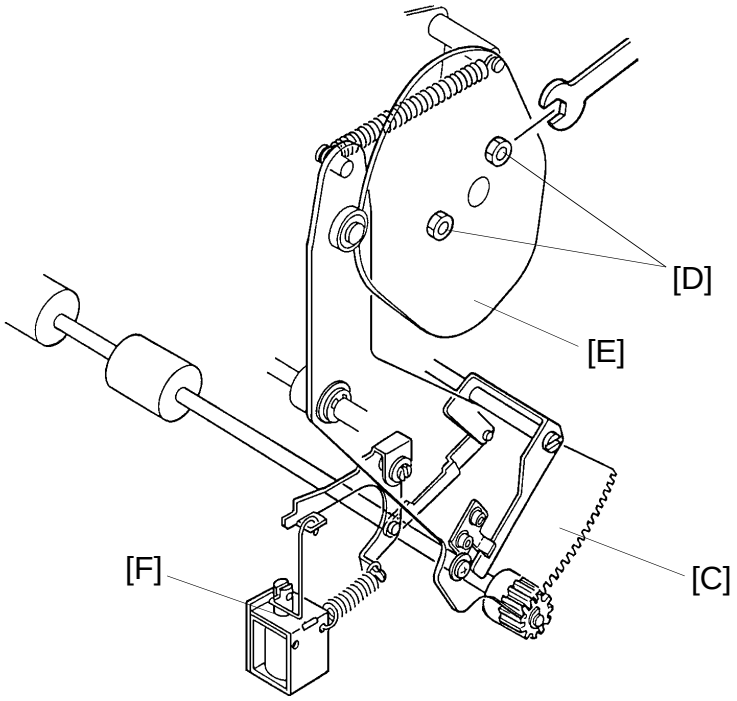
C223R551-1.img

Purpose: To ensure correct paper feed by calibrating the second feed roller start timing, and to adjust the leading edge margin.

Adjustment Standard: 177°

1. Set the Image Position indicator to the "0" position and return the drum to the home position by turning the main switch off and on. Then, turn the main switch off and unplug the machine.
2. Remove the rear cover of the machine.
3. Position a protractor [B] on the end of the image shift shaft [A].

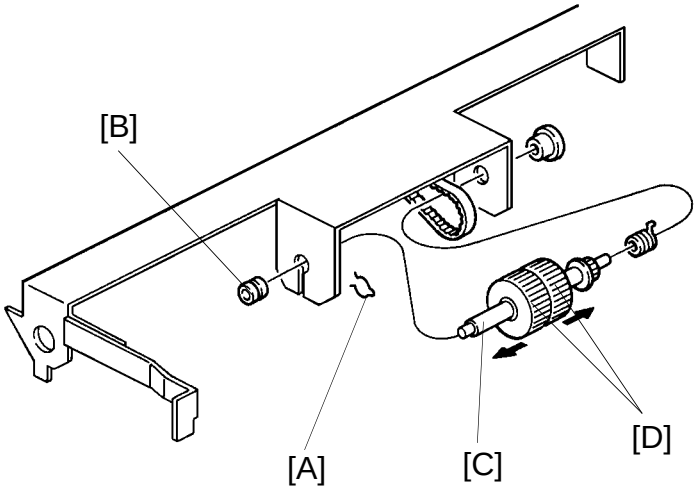
   NOTE: Align the origin of the protractor with the edge of the solenoid bracket [C].



C223R552.img

4. Turn on the paper feed solenoid [F] manually and, using a 10 mm spanner, gradually turn the drum rotation shaft.
5. Measure the degrees turned when the second feed roller sector gear [C] starts returning counterclockwise (when the second feed rollers start rotating). This should be 177°.
6. If it is not, loosen the 2 bolts [D] and adjust the second feed roller rotation timing by turning the cam [E].

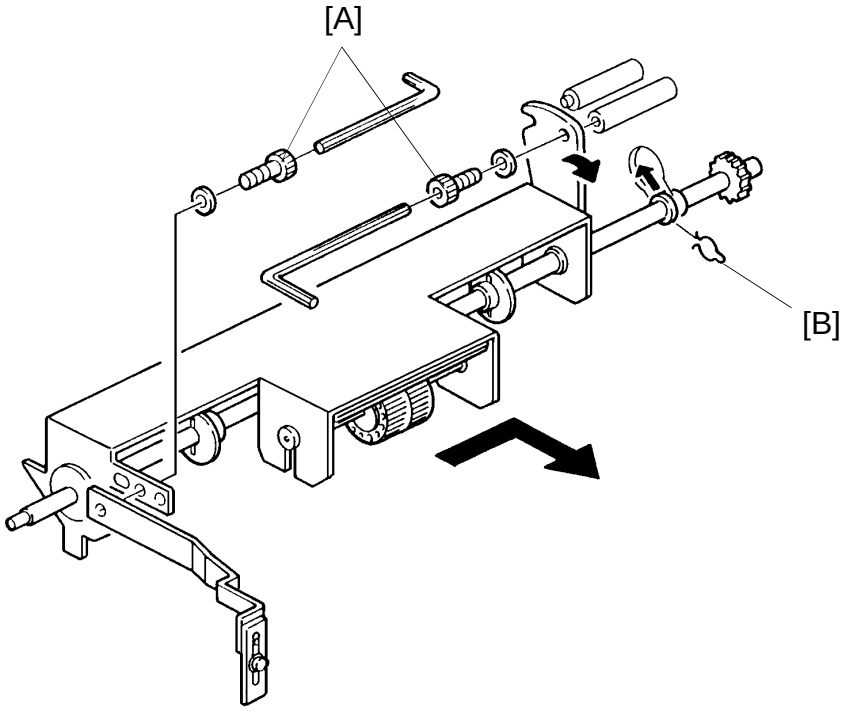
6.11 PAPER FEED ROLLER REMOVAL



C223R553.img

1. Remove the left clamper [A].
2. Remove the left bushing [B].
3. Remove the paper feed roller shaft [C].
4. Remove the 2 paper feed rollers [D].

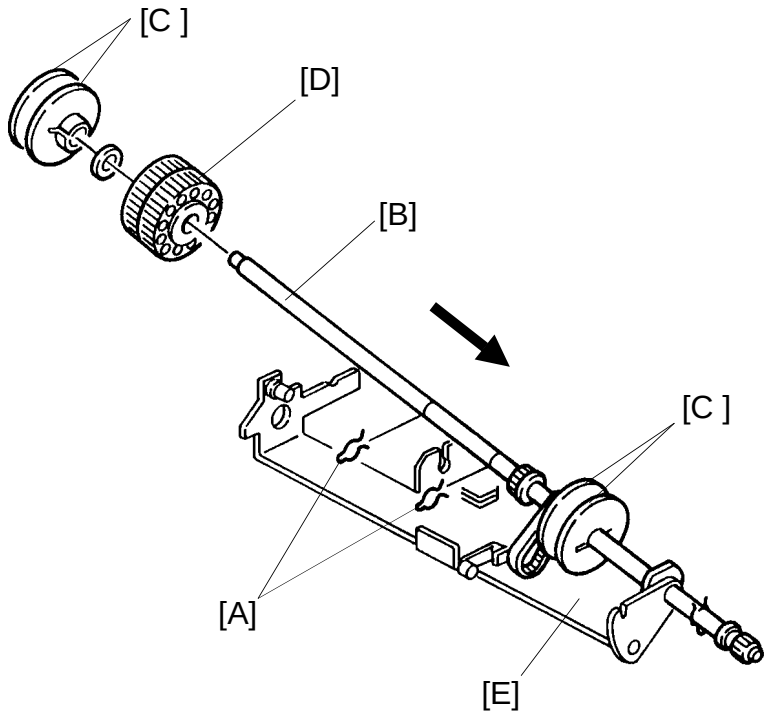
6.12 PAPER FEED ROLLER UNIT REMOVAL



C223R554.img

1. Remove the master making unit.
2. Remove 2 hexagon screws [A].
3. Remove the clamper [B].
4. Remove the paper feed roller unit from the machine by sliding the shaft to the rear.

6.13 UPPER SEPARATION ROLLER REMOVAL

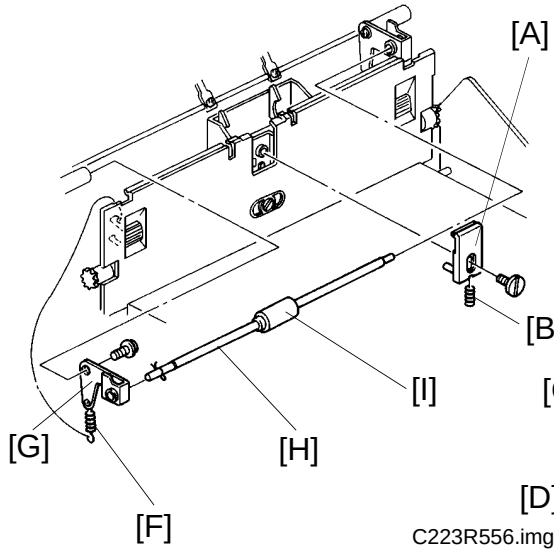


C223R555.img

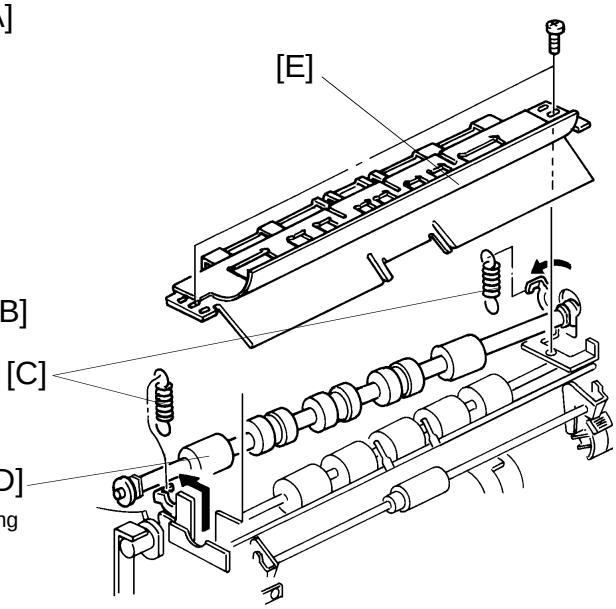
1. Remove the paper feed roller unit.
2. Remove the clamps [A] from both sides of the upper separation roller.
3. Slide the shaft [B] in the direction of the arrow.
4. Remove the guide disks [C] and remove the upper separation roller [D].

NOTE: When reassembling the paper feed roller unit, position the guide disks [C] under the cuts in the feed roller holder [E].

6.14 SEPARATION PLATE/LOWER SEPARATION ROLLER REMOVAL



C223R556.img



C223R557.img

Separation Plate

1. Remove the separation plate [A] with the spring [B] (1 screw).

Lower Separation Roller

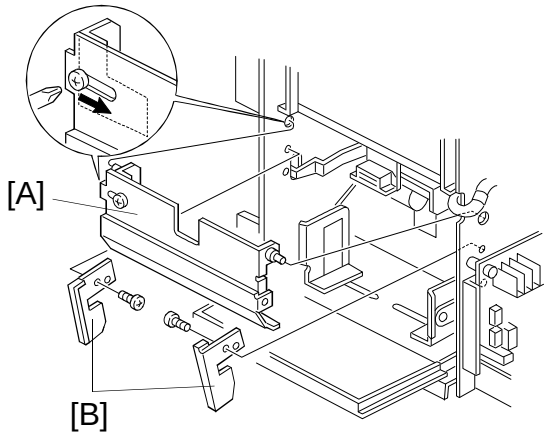
1. Remove the master making unit, paper feed roller unit, and drum unit.
2. Remove the 2 springs [C] and slide the upper second feed roller [D] in the direction of the arrow.

   NOTE: Use a spring hook. That way the spring will not drop into the machine.
3. Remove the upper and lower guide plates [E] (2 screws).

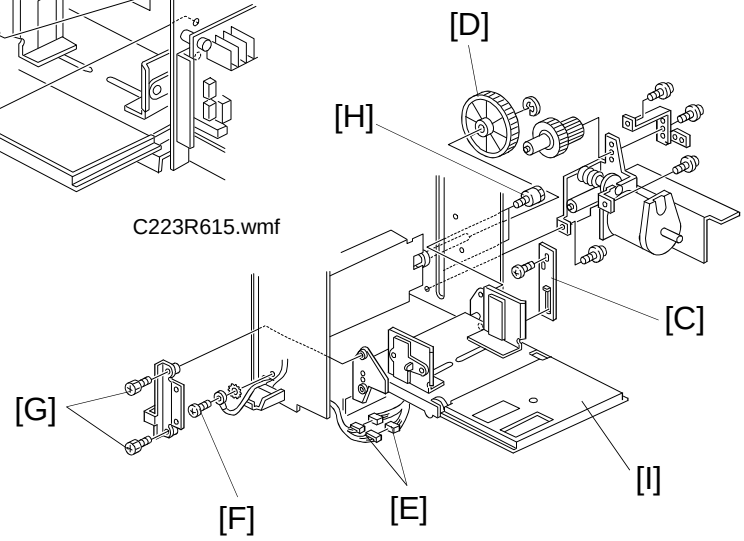
   NOTE: When putting back the guide plates, make sure that the guide plates do not touch the lower second feed roller.
4. Remove the spring [F] hooked on the front separation lever [G].
5. Remove the front separation lever [G] (1 screw).
6. Remove the lower separation roller shaft [H].
7. Remove the lower separation roller [I] from the shaft (one Allen screw).

   NOTE: When reassembling the lower separation roller, confirm that the front and rear separation levers [G] move smoothly.

6.15 PAPER FEED TABLE REMOVAL



C223R615.wmf



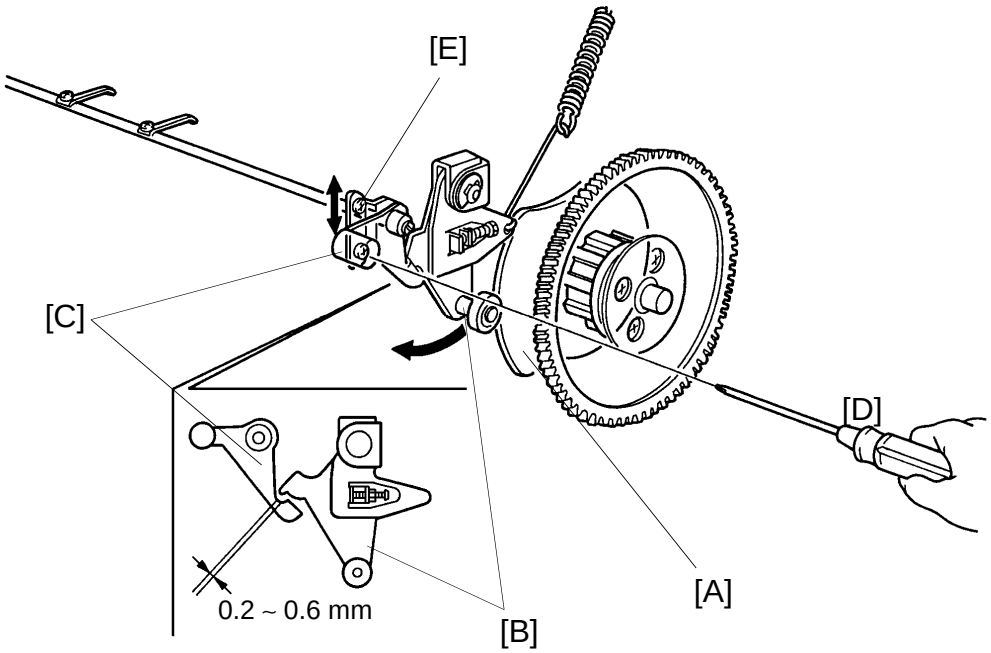
C223R616.wmf

1. Lower the paper table and disconnect the power cord.
2. Remove the right front cover, rear cover, and right cover.
3. Remove the noise reduction cover [A] (1 screw) and two brackets [B] (1 screw each).
4. Remove the plate [C] (1 screw).
5. Remove the paper table drive gear [D] (1 E-ring).
6. Disconnect the two connectors [E] and remove the two screws [F] securing the front and rear grounding wires.
7. Remove the sensor actuator bracket [G] (2 screws) and two studs [H].
8. Remove the paper feed table [I].

NOTE: When reassembling the machine, make sure that the paper table is level.

7. PRINTING

7.1 PAPER DETECTION ARM CLEARANCE ADJUSTMENT



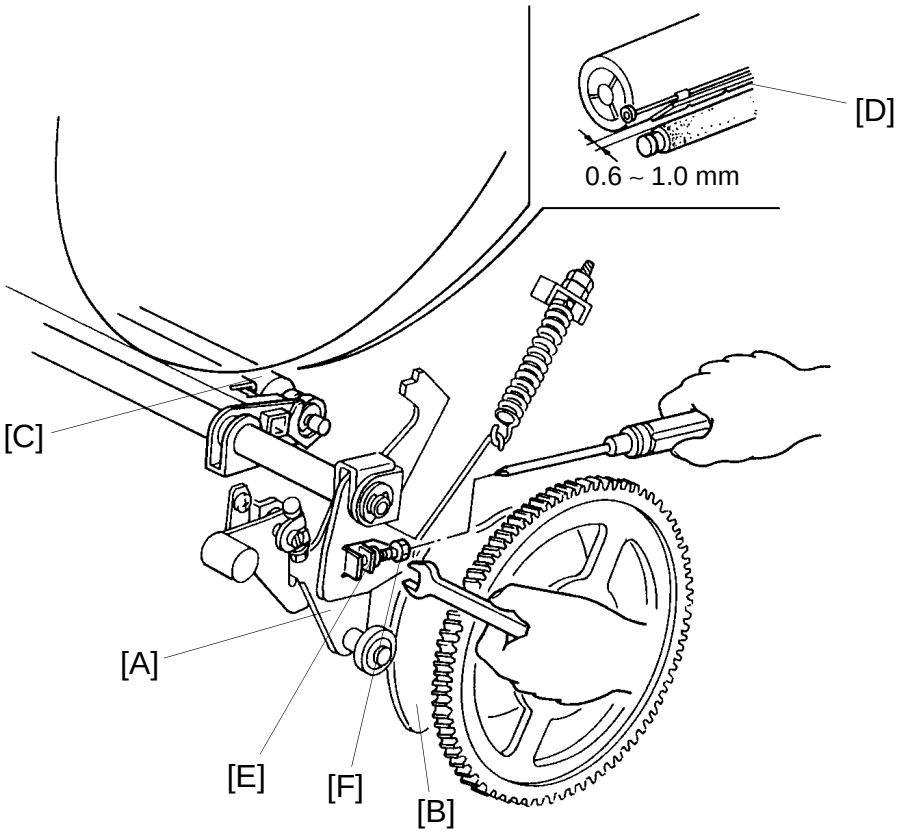
C223R558.img

Purpose: To ensure that printing pressure is applied during paper feed, and is released correctly afterwards.

Adjustment Standard: 0.2 to 0.6 mm

1. Remove the rear cover of the machine.
2. Using a 10 mm spanner, gradually turn the drum rotation shaft counterclockwise to position the bearing of the pressure release arm [B] at the widest part of the pressure cam [A].
3. Make sure that the clearance between the paper detection arm [C] and the pressure release arm [B] is 0.2 to 0.6 mm.
4. If it is not, loosen the screws [D] and adjust the clearance by shifting the paper detection bracket [E] up or down.
5. After adjusting, confirm that the printing pressure on/off mechanism is working properly. To do this, monitor a print run.

7.2 PRESS ROLLER POSITION ADJUSTMENT 1



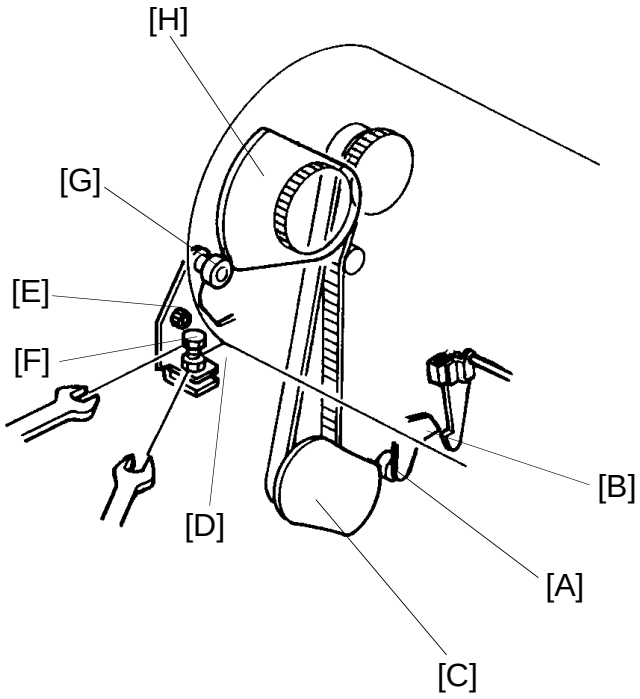
C223R559.img

Purpose: To ensure that the press roller does not touch the clamper section of the drum.

Adjustment Standard: 0.6 to 1.0 mm

1. Remove the rear cover of the machine.
2. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise and position the bearing of the pressure release arm [A] at the widest part of the pressure cam [B].
3. While the arm is at the widest part of the cam, make sure that the distance between the press roller [C] and the tip of the clamper [D] is 0.6 to 1.0 mm.
4. If it is not, loosen the hexagon nut [E] and adjust the clearance by turning the bolt [F].

7.3 PRESS ROLLER POSITION ADJUSTMENT 2 (FOR THE A4/LT DRUM)



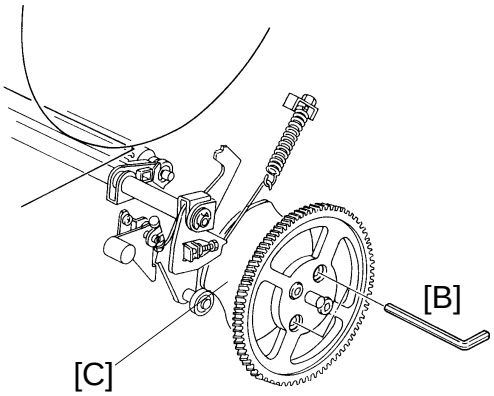
C223R612.img

Purpose: To keep the distance between the press roller and the drum constant while the printing pressure is released.

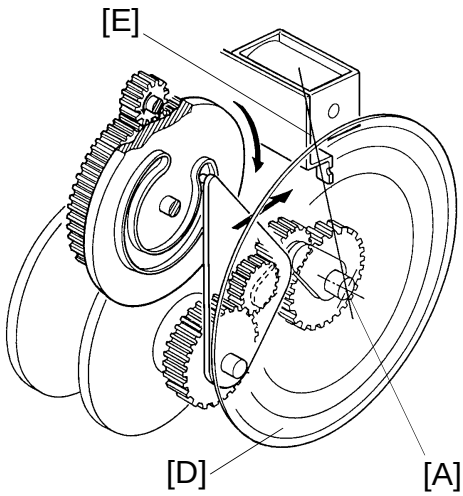
NOTE: Perform this adjustment after adjusting the press roller position 1.

1. Remove the master eject unit.
2. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise and position the bearing [A] of the pressure ON/OFF lever [B] on top of the pressure cam [C].
3. Loosen the bolt [D] fixing the arm [E].
4. Adjust the position of the bolt [F] using a 7 mm spanner so that the bearing [G] of the arm just touches the top of the A4 cam [H].
5. Rotate the bearing [G] manually. If there is no friction between the bearing and the cam, turn the bolt [F] clockwise.
6. Retighten the bolt [D].

7.4 PRESSURE TIMING ADJUSTMENT



C223R560.img



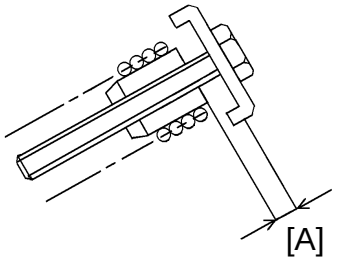
C223R551-2.img

Purpose: To ensure that the maximum printing area is within specifications, and that the ink does not stain the trailing edge.

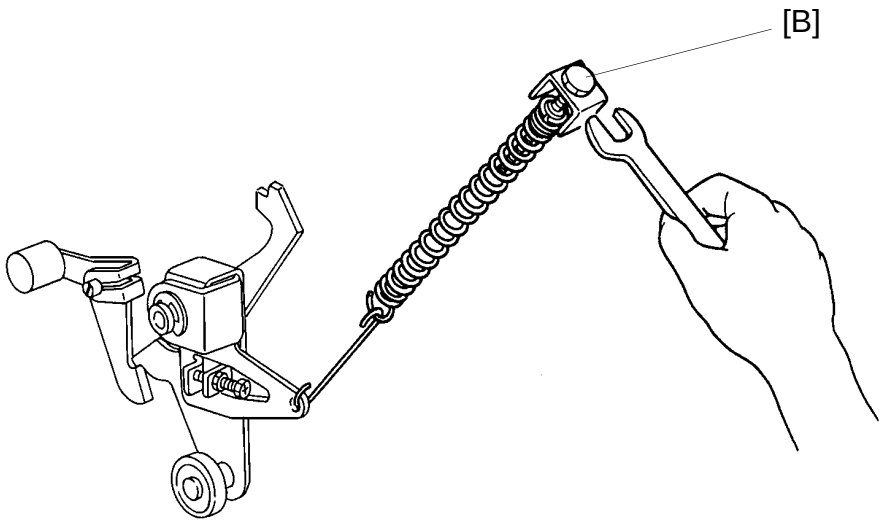
Adjustment Standard: 218 ± 2°

1. Stack about 100 sheets of paper on the table.
2. Set the Image Shifting indicator to the "0" position and return the drum to the home position by turning the main switch off and on.
3. Set up the paper table in the paper feed position. (Use output check mode (SP131) No. 19.) Turn the main switch off and unplug the machine.
4. Remove the rear cover of the machine.
5. Position a protractor [D] on the end of the image shift shaft [A]. Align the origin of the protractor with the edge of the solenoid bracket [E].
6. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise while pressing in the plungers of the paper feed and printing pressure solenoids by hand.
7. Turn the drum rotation shaft a little further, and stop it when the press roller begins to touch the drum surface.
8. In the above condition, measure the degrees turned; this should be 218 ± 2°.
9. If it is not, loosen the screw [B] of the pressure cam [C] and adjust the pressure timing by turning the cam [C].

7.5 PRINTING PRESSURE ADJUSTMENT



C223R562.img



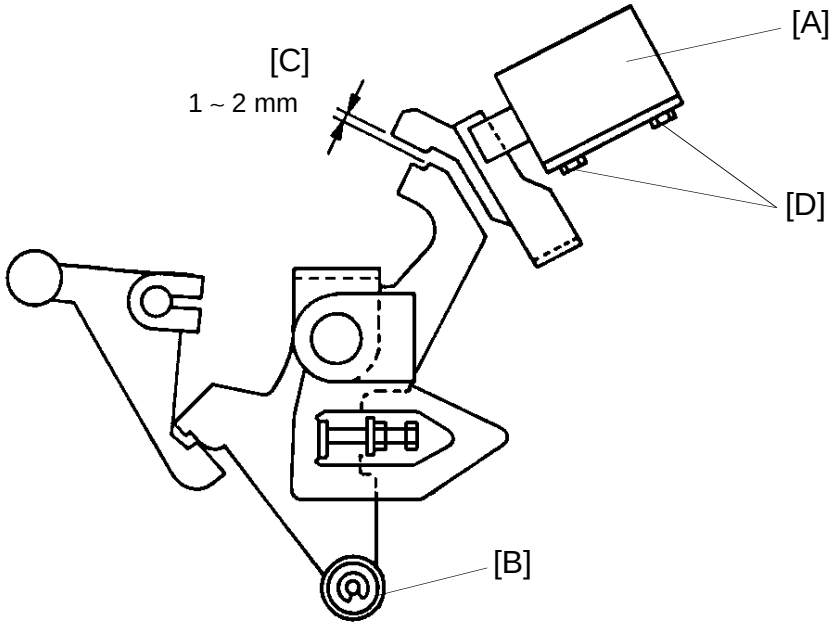
C223R563.img

Purpose: To apply the proper printing pressure to the press roller.

Adjustment Standard: 4 ± 0.5 mm

1. Remove the rear cover of the machine.
2. Adjust the clearance [A] to 4 ± 0.5 mm by turning the adjustment bolt [B].

7.6 PRINTING PRESSURE SOLENOID CLEARANCE ADJUSTMENT



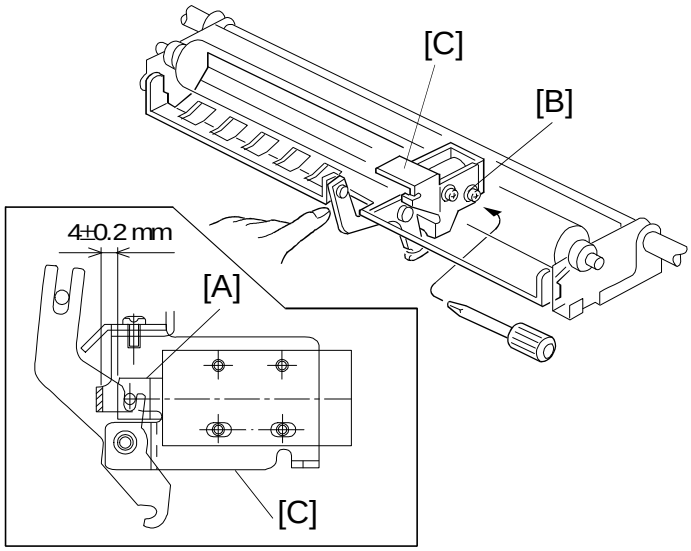
C223R564.img

Purpose: To ensure that the printing pressure stopper is released when paper feed starts, and that the stopper is locked within one drum rotation when a paper jam occurs.

Adjustment Standard: 1 to 2 mm

1. Manually press in the plunger of the printing pressure solenoid [A]. At this time rotate the drum rotation shaft with a 10 mm spanner until the bearing [B] rides at the widest part of the printing pressure cam.
2. Confirm that the clearance [C] is between 1 and 2 mm.
3. If it is not, loosen the hexagon head screws [D] and adjust the clearance by moving the printing pressure solenoid.

7.7 MASTER PRESS SHEET SOLENOID POSITION ADJUSTMENT



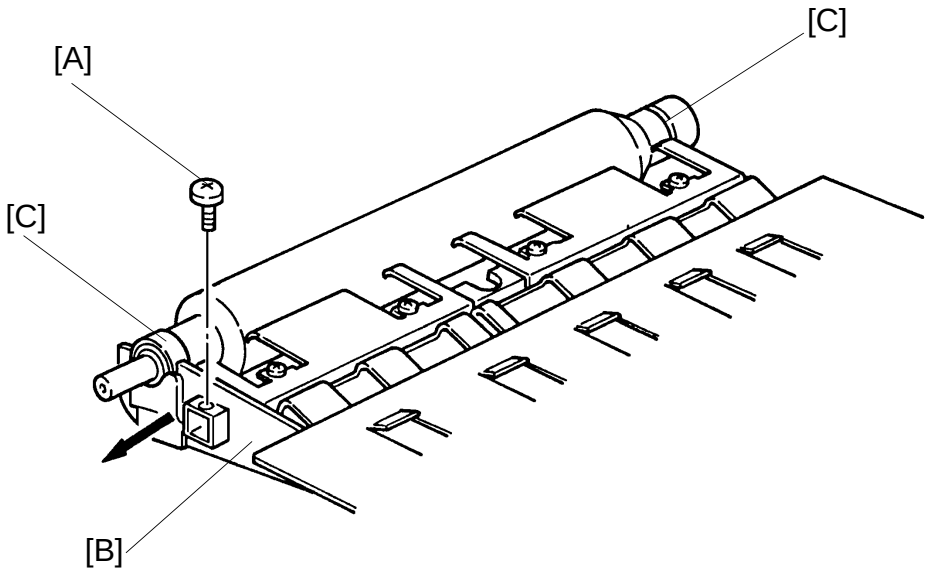
C223R565.wmf

Purpose: To ensure that the master press sheet covers the press roller when the solenoid is energized, and that the sheet does not interfere with paper feeding when the solenoid is off.

Adjustment Standard: 4 ± 0.2 mm

1. Remove the transport unit (see section 9-6, Transport Unit Removal).
2. Manually press in the plunger [A] of the master press sheet solenoid [B]. Check the gap between the tip of the solenoid plunger and the inside of the solenoid bracket [C].
3. If the gap is out of standard, loosen the two screws that hold the solenoid and adjust the solenoid position.

7.8 PRESS ROLLER REMOVAL

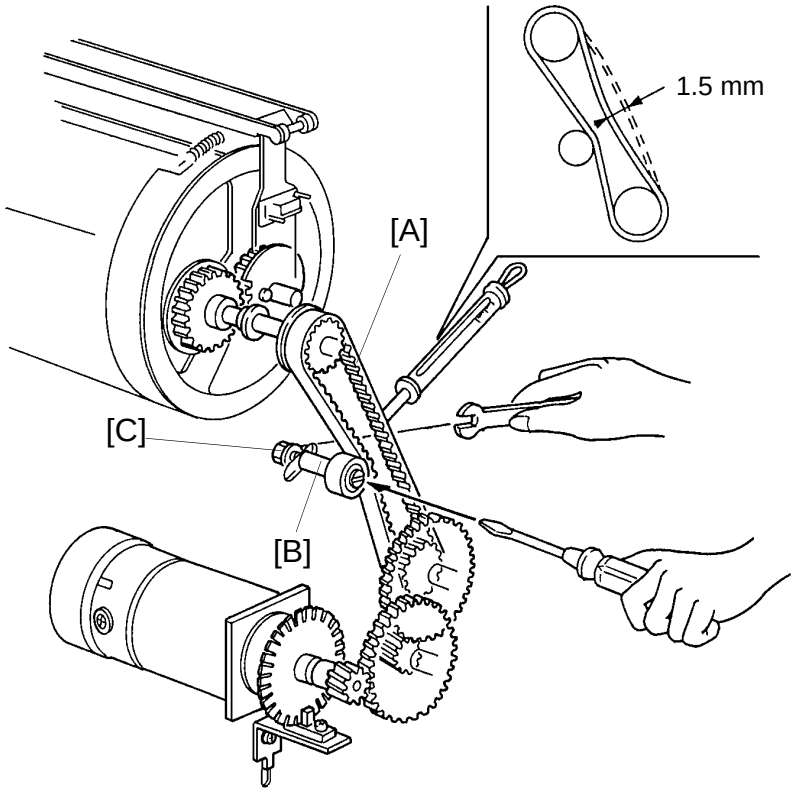


C223R567.img

1. Remove the screw [A].
2. Slide the holding plate [B] to the front side of the machine.
3. Remove the press roller.
4. Remove both right and left bearings [C] (2 E-rings).

8. DRUM

8.1 MAIN DRIVE BELT TENSION ADJUSTMENT



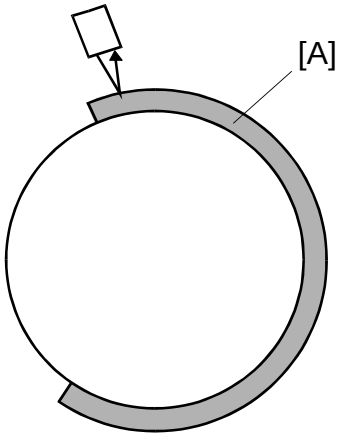
C223R568.img

Purpose: To ensure that the main motor rotation is correctly transmitted to the drum.

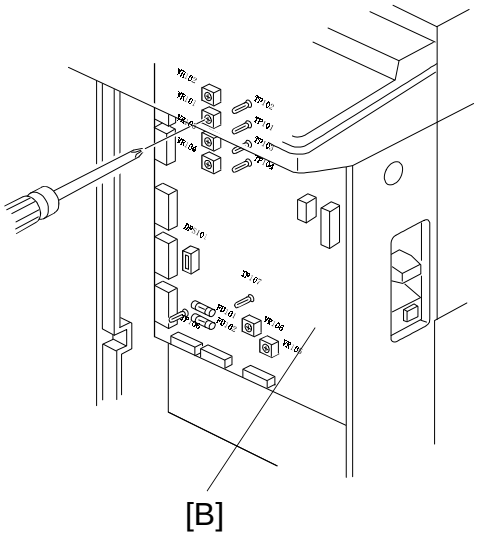
Adjustment Standard: 4 ± 0.2 mm

1. Remove the rear cover of the machine.
2. Apply a 1000-gram load (using a tension gauge) to the center of the main drive belt [A]. Make sure that the belt deflects 1.5 mm.
3. If it does not, remove the drum unit and adjust the belt tension by moving the tensioner shaft [B] after loosening the nut [C].
4. After adjusting, tighten the nut [C] very securely.

8.2 DRUM MASTER SENSOR



C223R569.wmf



C223R601-3.wmf

Purpose: To ensure that the drum master sensor correctly detects the master on the drum.

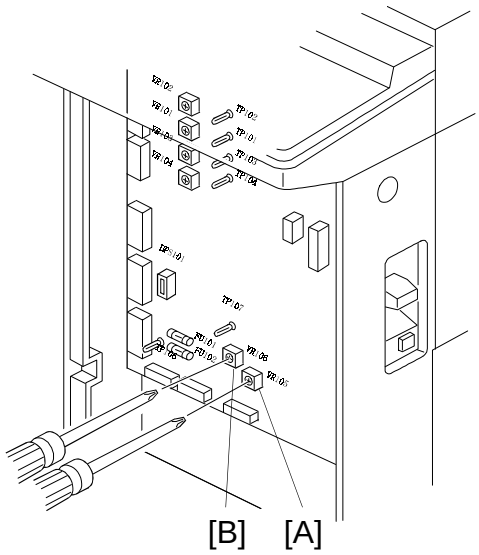
Adjustment Standard: 0.9 to 1.0 V when the sensor is activated, and 2.0 V or higher when it is not activated.

1. Slide out the drum unit and remove the master [A] from the drum.
2. Reinstall the drum unit. Press and hold down the Drum Rotation button until the drum reaches the home position.
3. Access SP mode and select No. 138. Then press the Print Start key. The drum master sensor voltage is displayed.

   NOTE: The voltage can also be checked using TP102 (drum master sensor output) and TP107 (GND).
4. If the voltage is outside the specified range, adjust VR102 on the main PCB [B].
5. Make a master with an all-white original.

   NOTE: Make sure the master's leading edge is held by the drum clamper and that the master [A] is wrapped correctly on the drum.
6. Make sure that the drum master sensor voltage is 2.0 V or higher. At this time, LED102 will light.

8.3 PRINTING SPEED ADJUSTMENT



C223R608-2.wmf

Purpose: To ensure the correct main motor speed.

Adjustment Standard:

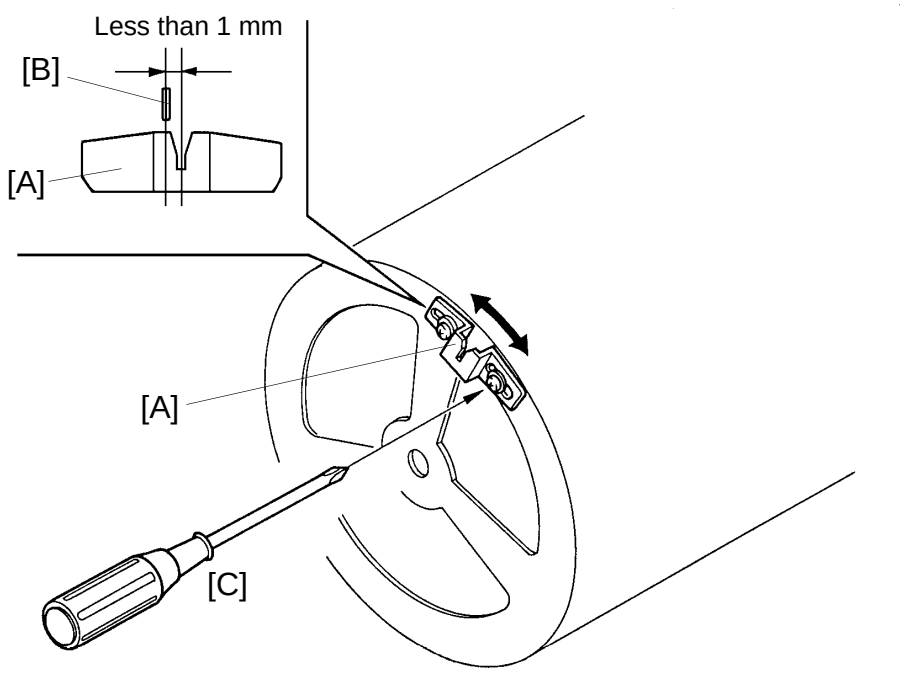
120 $^{+10}_{-0}$ rotations/minute when the fastest printing speed (speed 5) is selected. 60 $^{+0}_{-2}$ rotations/minute when the slowest speed (speed 1) is selected.

1. Press the Speed Change key to set the speed at the maximum level.
2. Make some prints. After the first print, the machine should produce 120 $^{+10}_{-0}$ prints every minute.
3. If it does not, adjust the speed of the main motor by turning VR105 [A].
4. Press the Speed Change key to select the slowest speed (speed 1).
5. Make some prints. After the first print, the machine should produce 60 $^{+0}_{-2}$ prints.
6. If it does not, adjust the speed of the main motor by turning VR106 [B].

NOTE: The fastest speed adjustment and the slowest speed adjustment do not affect each other. But both adjustments affect speeds 2, 3, and 4.

If the slowest speed (speed setting for the TS20 sorter) is faster than 60 cpm, the sorter speed cannot catch up with the machine speed and sorter jams might occur.

8.4 DRUM STOPPER ADJUSTMENT



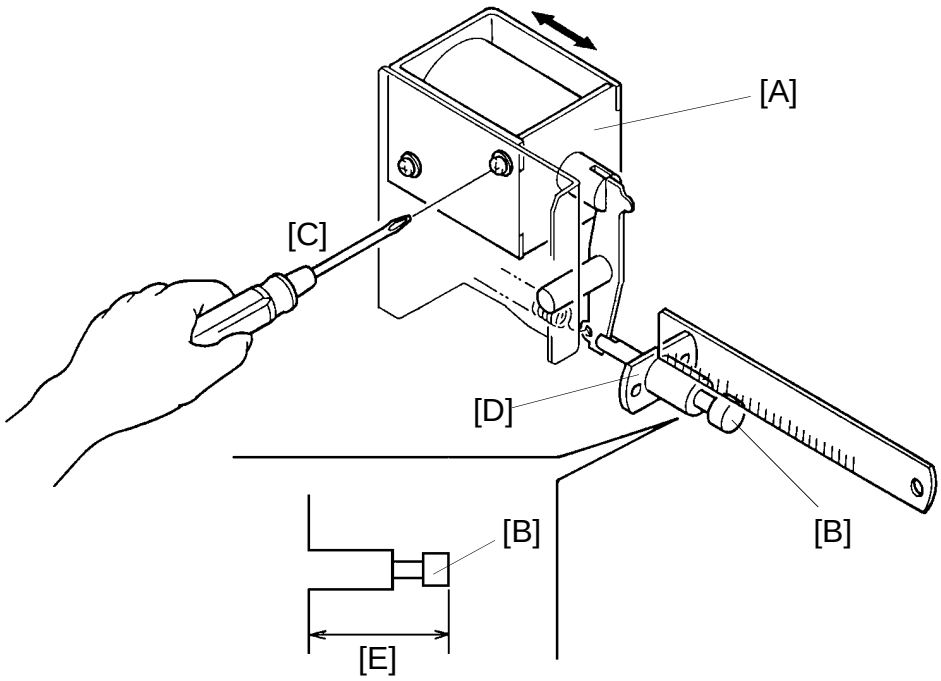
C223R571.img

Purpose: To ensure that the drum is securely locked when the drum unit is pulled out.

Adjustment Standard: Less than 1 mm

1. Remove the drum unit from the machine.
2. Make sure that the distance between the center of the drum lock [A] and the center of the drum stopper [B] is less than 1 mm.
3. If it is more than 1 mm, loosen the screws [C] and adjust the distance by moving the drum lock [A].

8.5 MASTER FEED CLAMPER CAM ADJUSTMENT



C223R572-1.img

Purpose: To ensure that the master feed clamper is open during the master feed process and is closed during other processes.

Adjustment Standard:

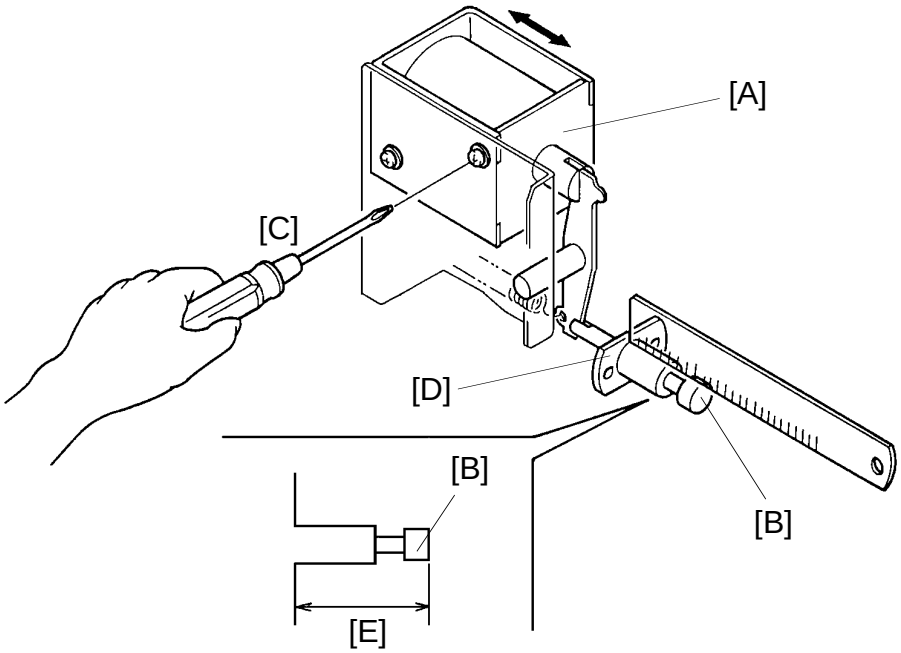
29 ± 0.5 mm when the solenoid is energized, and less than 25 mm when it is de-energized.

1. Remove the drum unit and open the master eject unit.
2. Using output check mode (SP131) No. 15, turn on the master feed clamper solenoid [A].
3. Confirm that the distance [E] between the bushing [D] and the edge of the cam [B] is 29 ± 0.5 mm when the solenoid is turned on.
4. If it is not, loosen the mounting screws [C] and adjust the solenoid position.

⚠CAUTION:
Do not leave the solenoid on longer than 10 seconds.

5. After adjusting, retighten the mounting screws [C].

8.6 MASTER EJECT CLAMPER CAM ADJUSTMENT



C223R572.img

Purpose: To position the master eject clamper cam [B] so that the master clamper opens correctly during the master eject process and closes correctly for all other processes.

Adjustment Standard:

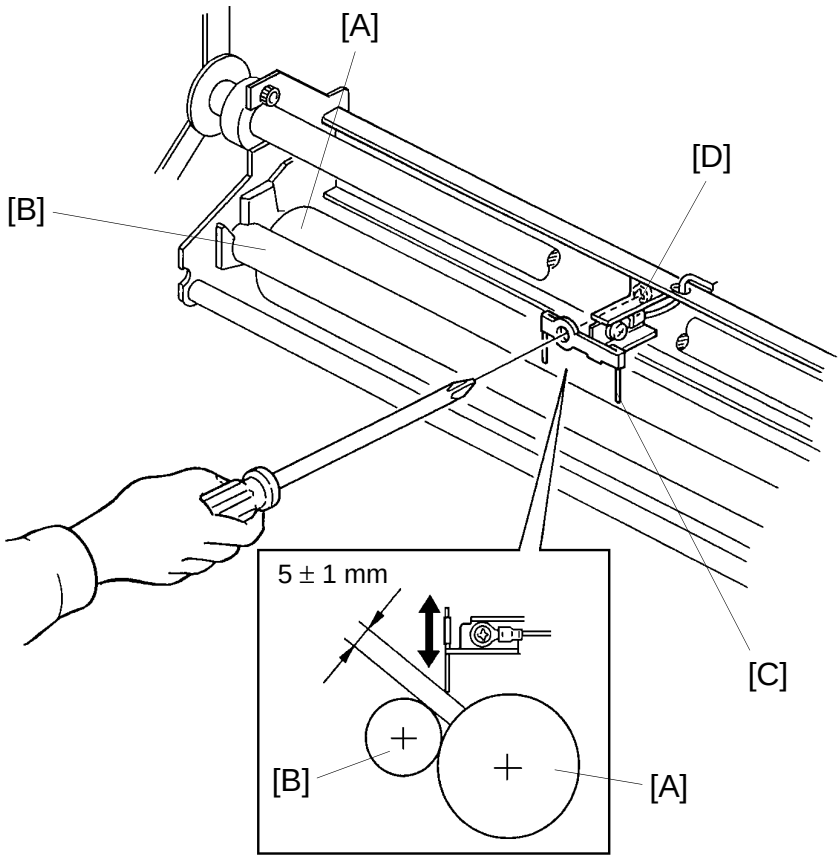
29 ± 0.5 mm when the solenoid is energized, and less than 25 mm when it is de-energized.

1. Remove the drum unit and open the master eject unit.
2. Using output check mode (SP131) No. 16, turn on the master eject clamper solenoid [A].
3. Confirm that the distance [E] between the bushing [D] and the edge of the opening cam [B] is 29 ± 0.5 mm when the solenoid is turned.
4. If not, loosen the mounting screws [C] and adjust the solenoid position.

⚠**CAUTION:**
Do not leave the solenoid on longer than 10 seconds.

5. After adjusting, retighten the mounting screws [C].

8.7 INK DETECTION PIN ADJUSTMENT



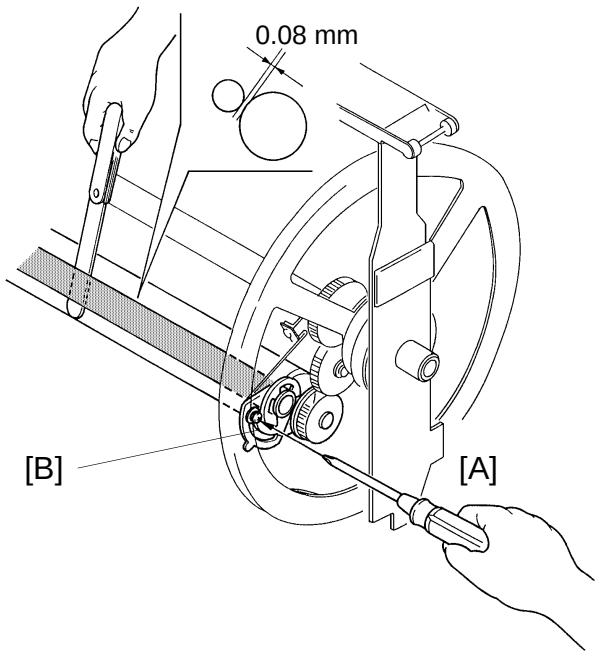
C223R574.img

Purpose: To ensure detection of ink build-up between the ink roller and the doctor roller.

Adjustment Standard: 5 ± 1 mm

1. Remove the drum unit.
2. Remove the cloth screen and the metal screen from the drum unit.
3. Remove the ink distributor (2 screws).
4. Wipe off the ink around the ink roller [A] and the doctor roller [B].
5. Make sure that the distance between the end of the ink detection pin [C] and the doctor roller [B] surface is 5 ± 1 mm.
6. If it is not, loosen the screw [D] and adjust the distance by moving the ink detection pin [C].
7. After adjusting, retighten the screw [D].

8.8 INK ROLLER GAP ADJUSTMENT



C223R575.img

Purpose: To equalize the ink thickness around the ink roller and prevent an uneven image.

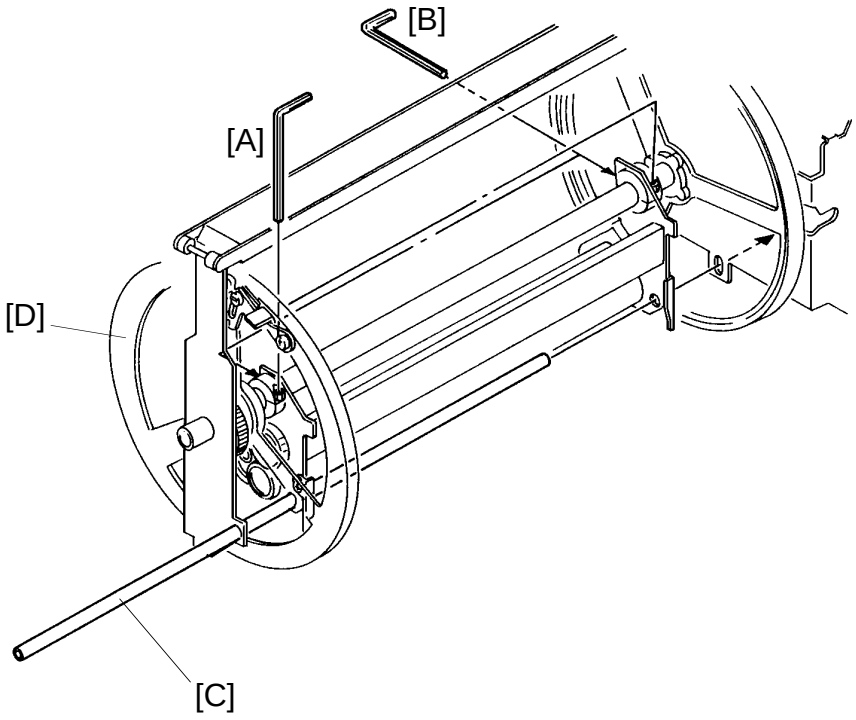
Adjustment Standard: 0.08 mm

1. Remove the drum unit.
2. Remove the clamper.
3. Remove the cloth screen and the metal screen from the drum unit.
4. Remove the ink distributor (2 screws).
5. Wipe off the ink around the ink roller and the doctor roller.
6. Insert a 0.08-mm gap gauge between the doctor roller and the ink roller. Then make sure that a 0.1-mm gauge can not penetrate the gap.

   NOTE: Check the gap at the right, center, and left positions.
7. If the gap is not within specifications, loosen the screw [A] and adjust the gap by turning the eccentric bushing [B].

   NOTE: Before adjusting, remove the drive gear located on the operation side of the doctor roller because the drive gear restricts the adjustment.

8.9 INK ROLLER POSITION ADJUSTMENT



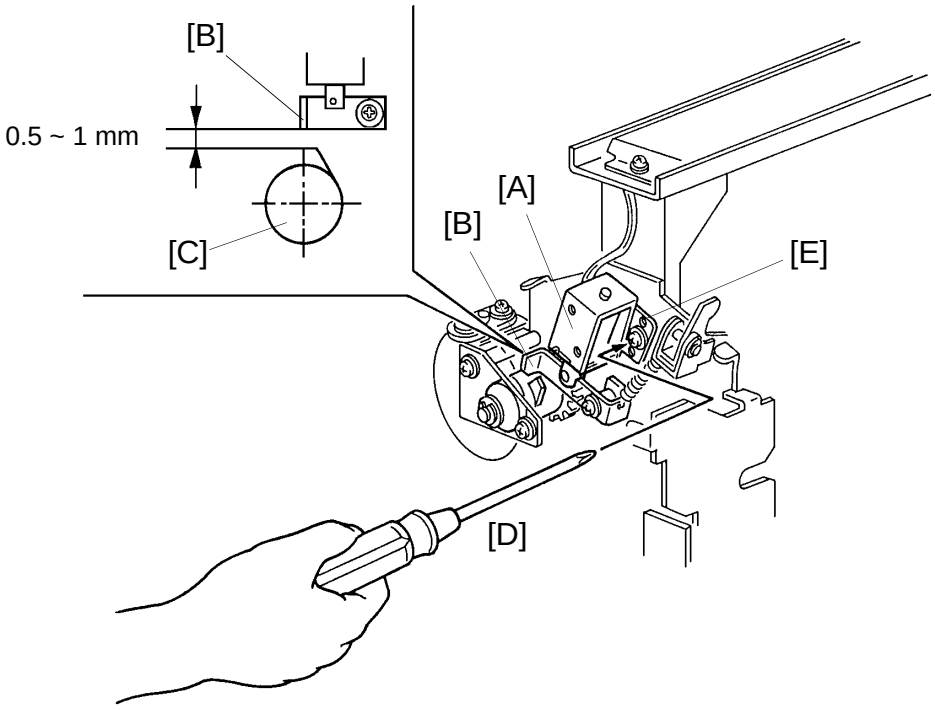
C223R576.img

Purpose: To ensure that the pressure of the press roller is applied evenly to the ink roller.

Adjustment Standard: The drum gauge must be inserted.

1. Remove the drum unit from the machine.
2. Remove the cloth screen and the metal screen from the drum unit.
3. Loosen the bolts [A] and [B] that secure the ink roller unit to the drum shaft.
4. Insert the drum gauge [C] (P/N C2009001) in the holes in both side plates of the drum unit and in both side plates of the ink roller unit.
5. With the gauge in the holes, tighten the bolts [A] and [B] so that the rotational thrust play of the flange [D] is between 0.05 and 0.2 mm.

8.10 INK SUPPLY SOLENOID ADJUSTMENT



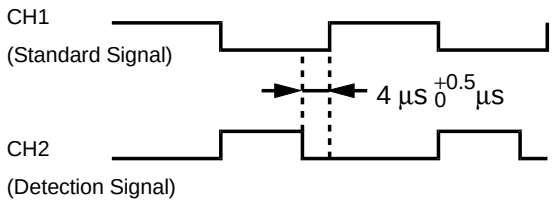
C223R577.img

Purpose: To ensure total clutch-sleeve release by the stopper when the ink supply solenoid [A] turns on and complete clutch-sleeve locking by the stopper when the ink supply solenoid turns off.

Adjustment Standard: 0.5 to 1 mm

1. Remove the drum unit from the machine.
2. Remove the upper ink supply solenoid cover and remove the front cover of the drum unit.
3. Press in the solenoid plunger by hand and make sure that the distance between the stopper [B] and the clutch sleeve [C] is between 0.5 mm and 1.0 mm as shown.
4. If it is not, loosen the screw [D] and adjust the distance by moving the solenoid bracket [E].
5. After adjusting, retighten the screw [D].

8.11 INK DETECTION ADJUSTMENT



C223R578.wmf

Purpose: To ensure that the ink detection PCB detects a no ink condition when the ink is running out.

Adjustment Standard: See the above illustration.

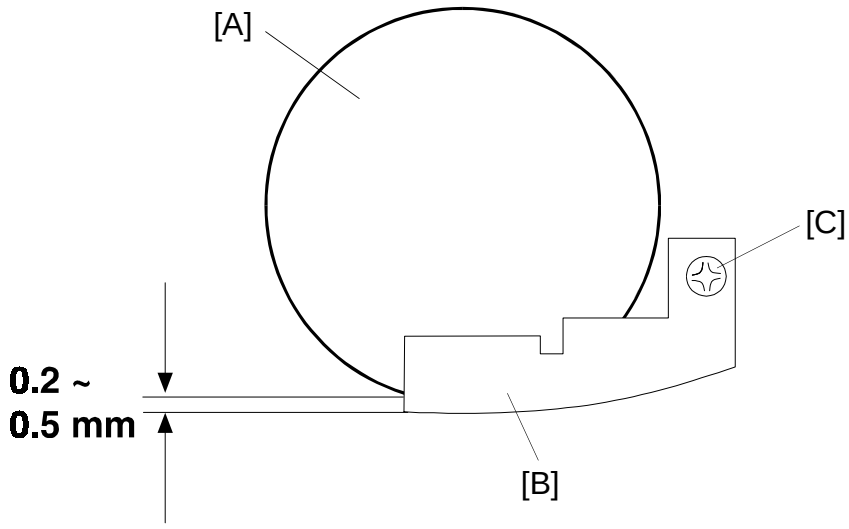
1. Remove the rear cover of the machine.
2. Connect the CH1 probe of an oscilloscope to TP1, the CH2 probe to TP2 and the GND lead to TP-12 V. Select the 5 microsecond range.
3. Turn on the main switch and install a drum with no ink. Or instead, remove the ink bottle and make prints until the Add Ink indicator lights.
4. Make sure that the waveform is as shown.

   NOTE: 1. This adjustment should be made under normal conditions (20°C/65 %RH).

   2. The period of the waveform varies inversely with temperature. (High temp. → reduced period, Low temp. → increased period)
5. If it is not, adjust the ON timing of the detection signal using VR901 on the ink detection PCB.

Replacement Adjustment

8.12 INK ROLLER BLADE ADJUSTMENT



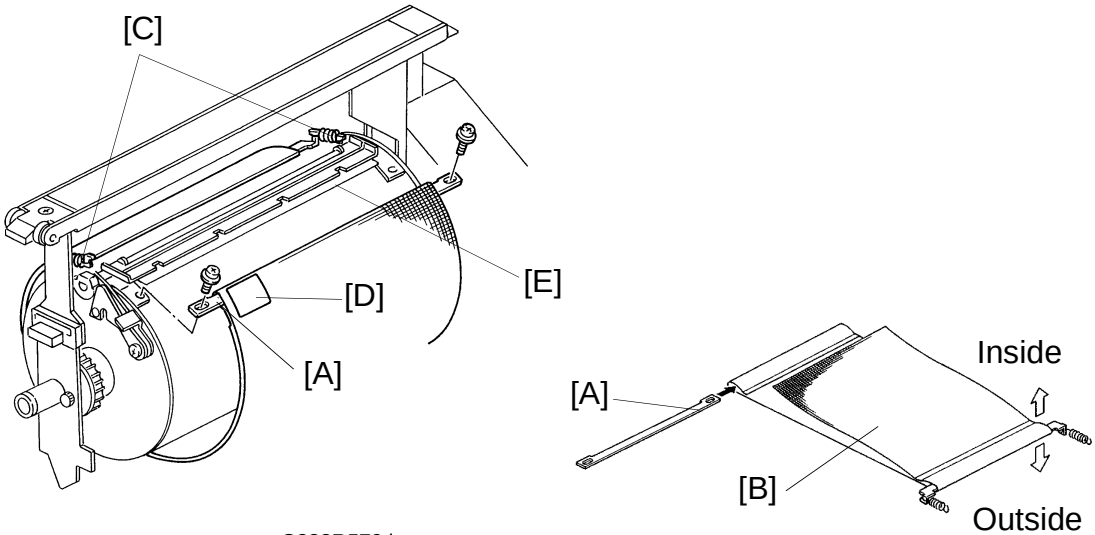
C223R617.wmf

Purpose: To prevent ink leakage from both edges of the ink roller.

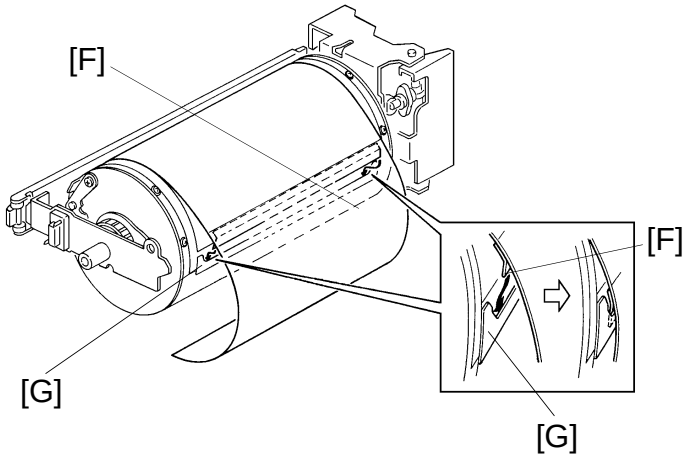
Adjustment Standard: 0.2 to 0.5 mm

1. Remove the drum unit from the machine.
2. Remove the cloth screen and the metal screen.
3. Check that the distance between the edge of the ink roller [A] and the edge of the ink roller blade [B] is 0.2 to 0.5 mm.
4. If the distance is out of standard, loosen the screw [C] and adjust the ink roller blade position.
5. Retighten the screw [C].

8.13 DRUM SCREEN REMOVAL



C223R579.img



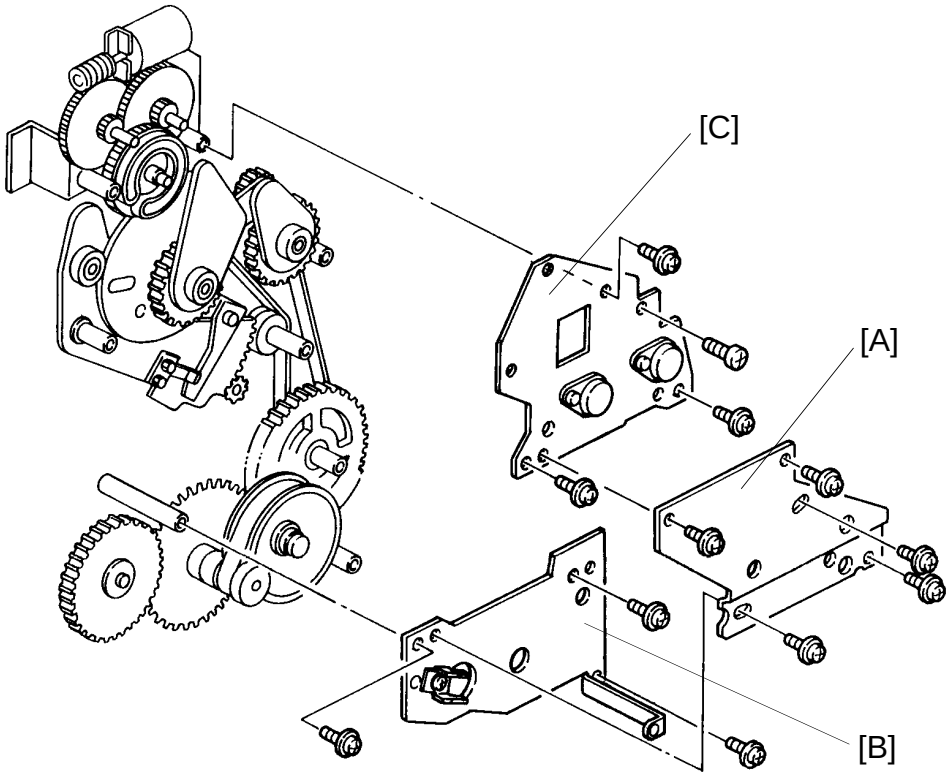
C223R581.img

C223R580.img

1. Remove the drum unit from the machine.
2. Remove the front stay [A] of the screen [B] (2 screws).
3. Remove the 2 springs [C].
4. Remove the screen [B].

NOTE: 1. Make sure that the black seal [D] is on the front side (outside) of the screen when reinstalling it.
2. Make sure that the front stay [A] comes under the clamper plate [E] when reinstalling it.
3. Make sure that the mylar [F] attached to the screen is correctly inserted into the pocket [G] on the drum.

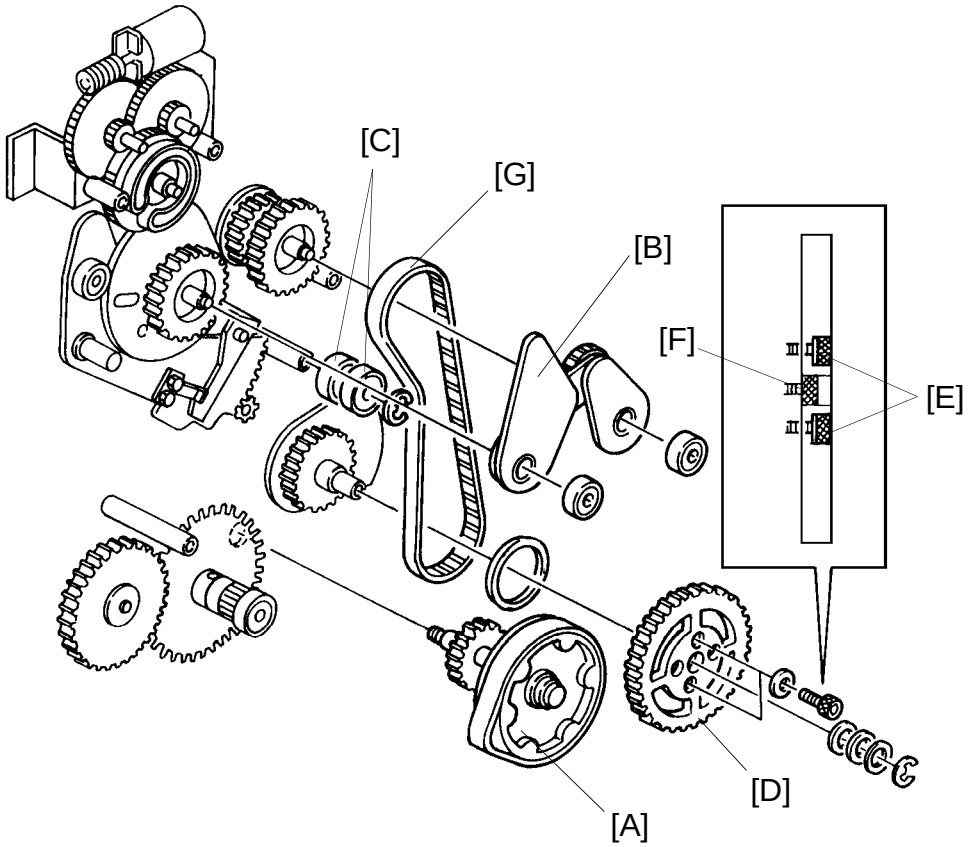
8.14 DRUM DRIVE BELT REPLACEMENT



C223R582.img

Removal:

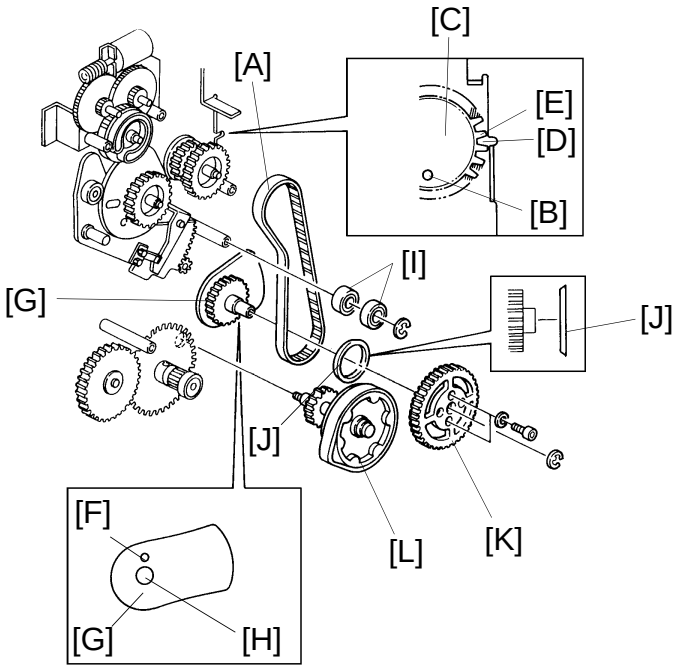
1. Set the image position to "0" by turning the main switch off and on.
2. Turn off the main switch and unplug the power supply cord.
3. Remove the drum unit.
4. Remove the rear cover.
5. Remove the center support plate [A] (5 screws).
6. Remove the lower support plate [B] (3 screws).
7. Remove the upper support plate [C] (4 screws).



C223R583.img

8. Remove the relay gear assembly [A].
9. Remove the timing gear assembly [B].
10. Remove two belt tension bearings [C].
11. Remove the pressure cam drive gear [D] (2 hexagon bolts [E] and 1 E-ring).

    NOTE: Four hexagon bolts secure the gear [D]. Do not loosen the two deeply recessed bolts [F].
12. Remove the drum drive belt [G].



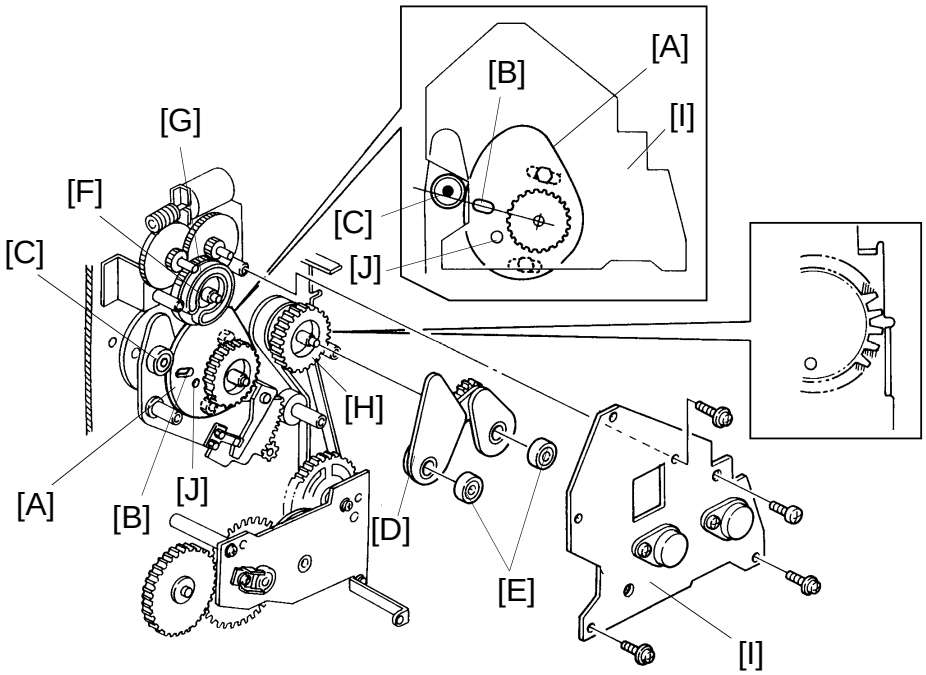
C223R584.img

Re-assembly:

1. Install a new drum drive belt [A].
2. Adjust the drum drive belt position.
   1) The alignment hole [B] in the drum drive gear [C] should be aligned with the hole in the rear side plate. At this time, the notch [D] in the plate lines up with the center of the drum drive gear cutout [E].
   2) The alignment hole [F] in the pressure cam [G] should be right over the pressure cam shaft [H].
3. Install two belt tension bearings [I] (1 E-ring).

   NOTE: Make sure that the drum drive gear and the pressure cam are in the proper position as explained above.
   If the relation between the printing pressure cam [G] position and the drum drive gear [C] position is wrong, printing pressure will be applied too late or too early. For each misaligned tooth between the cam and the gear, the print will appear 23 mm too far up or too far down.
4. Install the white spacer [J] and the pressure cam drive gear [K] (2 hexagon bolts).

   NOTE: Take care to install the white spacer [J] with the correct face towards the gear. (See the above diagram.)
5. Install the relay gear assembly [L] and the relay belt.
6. Install the lower support plate (3 screws).



C223R585.img

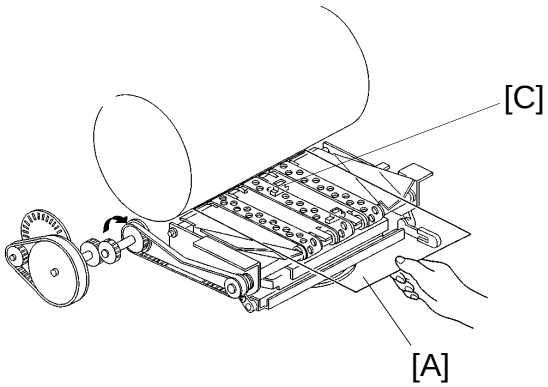
7. Adjust the position of the second feed cam [A] so that the center of the slot [B] in the second feed cam is aligned with the bearing shaft [C].
8. Install the timing gear assembly [D] with the two bearings [E].

   NOTE: Make sure that the pin on the timing gear assembly is in the spiral groove [F] in the cam gear [G].
   Make sure that the drum drive gear [H] is at the home position (see step 2, sub-step 1).
9. Install the upper support plate [I] (4 screws).
10. Push down lightly on the second feed cam [A] to hold it firmly in place. While still holding it, make sure that the hole [J] in the second feed cam is aligned with the small hole in the upper support plate [I]. If it is not, repeat steps 7 to 10.
11. Make some prints to check the leading edge registration.
12. If the registration is off by more than 12 mm, repeat steps 7 to 11. If the registration is less than 12 mm, adjust the relation between the feed rollers and the gear as explained in the "Second Feed Roller Start Timing" section.

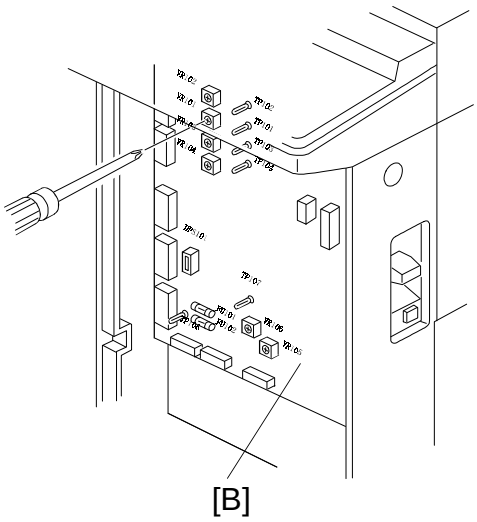
    NOTE: For each misaligned tooth of the feed cam gear, the registration is changed by approximately 12 mm.
13. Install the center support side plate (5 screws).

9. DELIVERY

9.1 FIRST PAPER EXIT SENSOR ADJUSTMENT



C223R586-1.img



C223R601.wmf

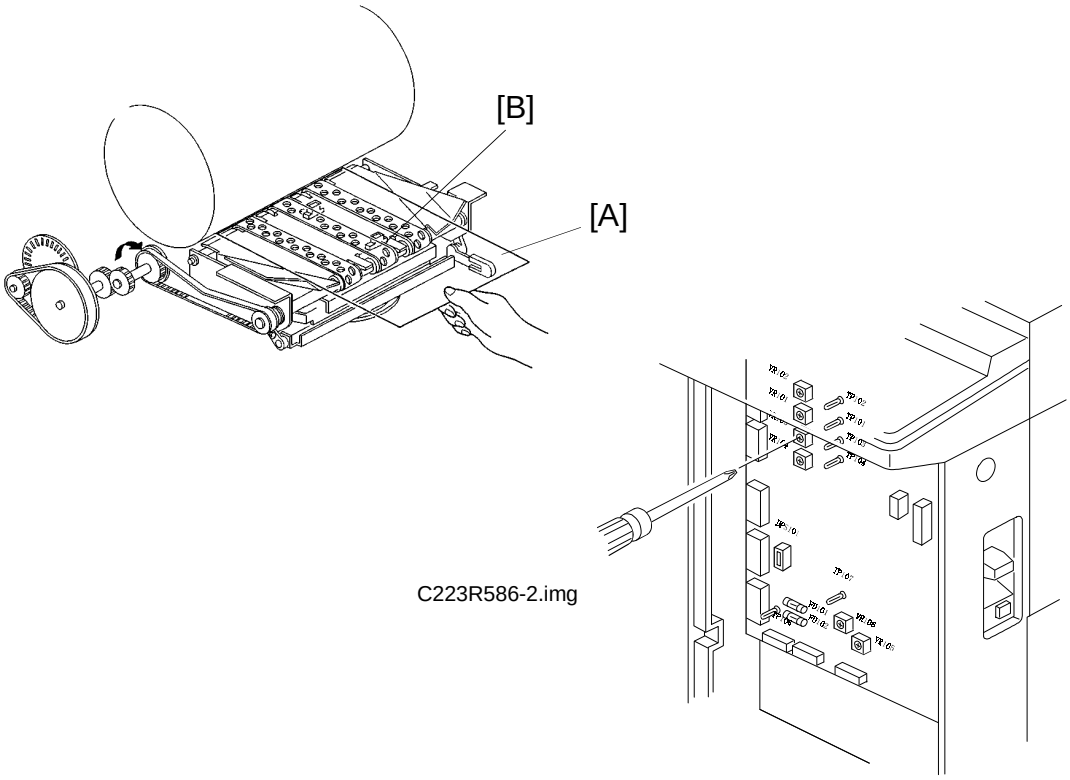
Purpose: To ensure that the sensor detects correct paper delivery, and to ensure that the jam indicator blinks properly after an exit misfeed or a paper wrap occurs.

Adjustment Standard: 0.8 to 0.9 V

1. Remove the right front cover of the machine.
2. Wrap a sheet of paper [A] around the drum.
3. Access SP mode and select No. 135. Then press the Print Start key. The 1st exit sensor voltage is displayed. It should be between 0.8 and 0.9 volts.

   NOTE: The 1st exit sensor voltage can also be checked using TP101 (1st exit sensor output) and TP107 (GND).
4. If it is not, adjust the sensor sensitivity by turning VR101 on the main PCB [B].
5. To confirm that LED 101 turns ON and OFF, activate the first paper exit sensor [C]. Use a sheet of paper to activate the sensor.

9.2 SECOND PAPER EXIT SENSOR ADJUSTMENT



C223R586-2.img

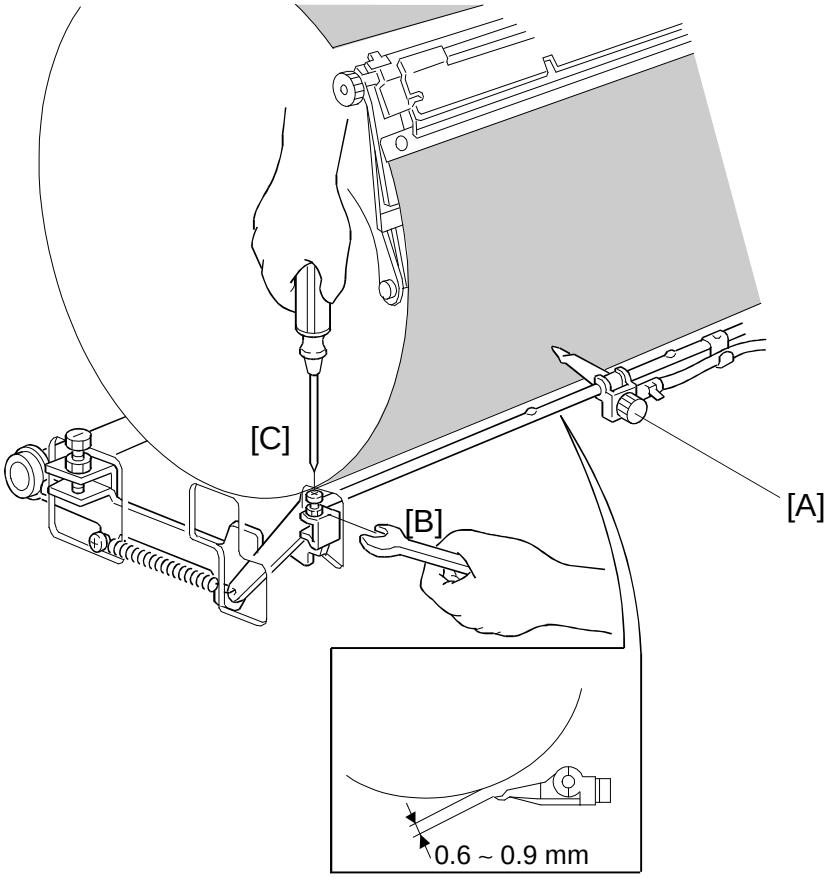
C223R619.wmf

Purpose: To ensure the sensor detects printing paper correctly, and to ensure that the jam indicator blinks and the machine stops when a paper wrap or an exit misfeed occurs.

Adjustment Standard: VR103 is set at the on/off threshold of LED103 [D].

1. Remove the right front cover of the machine.
2. Place a sheet of paper [A] 15 mm away from the second paper exit sensor [B]. Make sure that VR103 is set at the on/off threshold of LED103.
3. If it is not, adjust the sensor sensitivity by turning VR103 on the main PCB.

9.3 EXIT PAWL CLEARANCE ADJUSTMENT



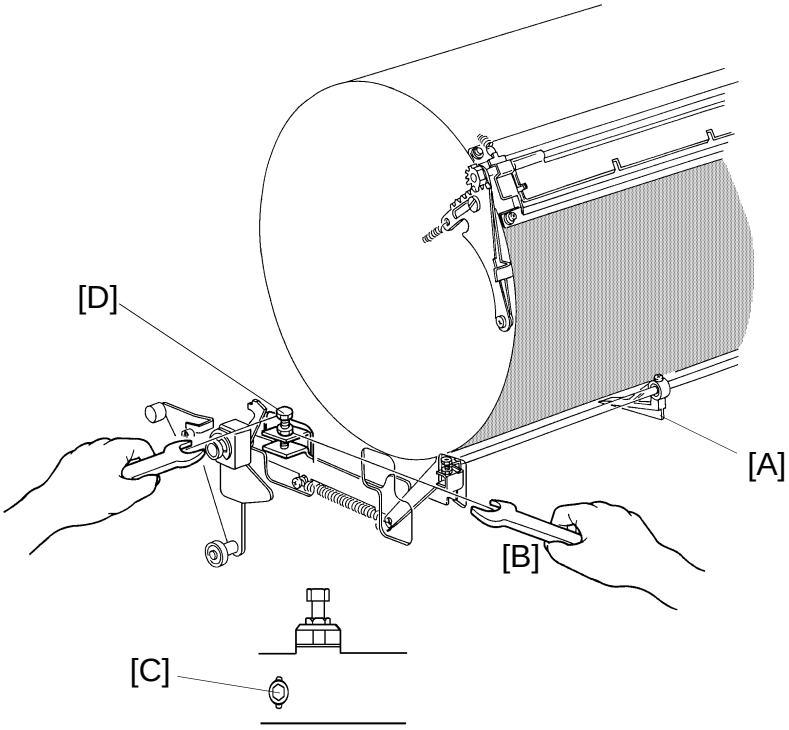
C223R588.img

Purpose: To ensure that the printing paper is delivered without a paper wrap problem or damage to the screen.

Adjustment Standard: 0.6 to 0.9 mm

1. Remove the rear cover of the machine and open the master eject unit.
2. Put a few sheets of paper on the paper table. Then, set up the paper table in the paper feed position. (Use output check mode No. 19.)
3. To feed a sheet of paper, turn on the paper feed solenoid by hand, and using a 10 mm spanner, gradually rotate the drum rotation shaft and at the same time manually turn on the printing pressure solenoid to move the exit pawl [A] to the drum.
4. Make sure that the clearance between the drum and the exit pawl is between 0.6 and 0.9 mm when the exit pawl is closest to the drum.
5. If it is not, loosen the hexagon nut [B] of the exit pawl drive arm. Then adjust the clearance by turning the screw [C].
6. Check the adjustment by repeating steps 3 and 4.

9.4 EXIT PAWL TIMING ADJUSTMENT



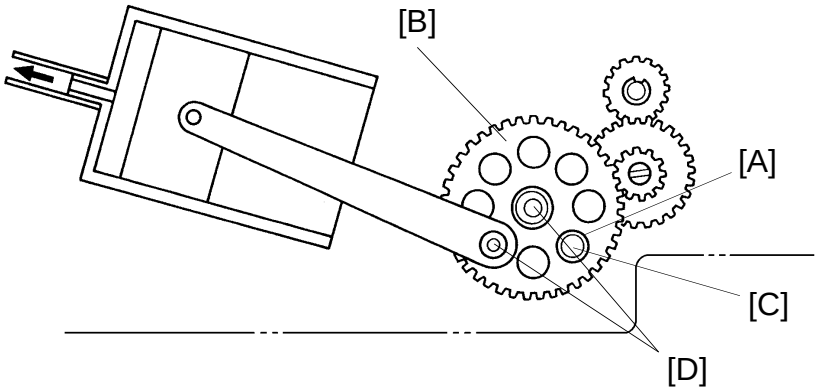
C223R589.img

Purpose: To ensure that the exit pawl does not touch the master clamper.

Adjustment Standard: 230 ± 2°

1. Remove the rear cover of the machine.
2. Press and hold down the Drum Rotation button until the drum reaches the home position.
3. Position a protractor on the end of the image shift shaft. Position the origin of the protractor at the bracket of the master feed clamper solenoid.
4. Manually press in the plunger of the printing pressure solenoid. Release the paper detection arm manually by rotating the drum rotation shaft with a spanner (10 mm).
5. Measure the degrees turned when the exit pawl [A] comes closest to the drum. This must be 230 ± 2°.
6. If it is not, loosen the hexagon nut [B] and screw [C] , then adjust the exit pawl position by turning the hexagon bolt [D].
7. Check the adjustment by repeating steps 4 to 6.

9.5 PAPER EXIT PAWL AIR PUMP ADJUSTMENT



C223R590.img

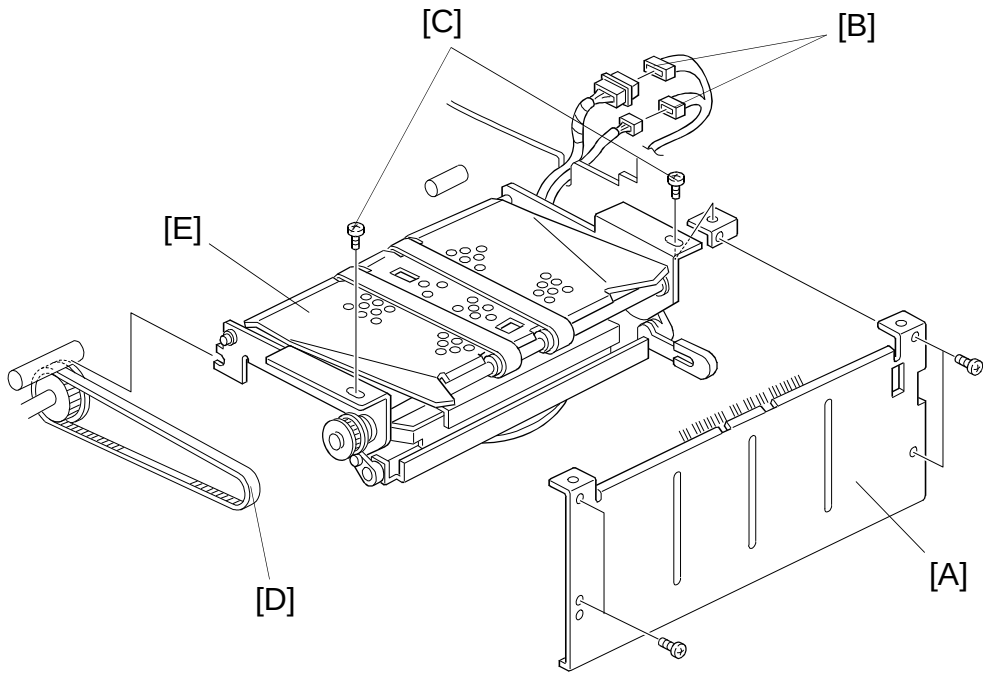
Purpose: To ensure that the paper exit pawl air pump produces a jet of air when the paper exit pawl is in the upper position (near the drum surface).

Adjustment Standard:

When the drum has rotated 341 degrees, the pump piston position is at the upper dead point.

1. Open the front door and remove the inner cover.
2. Press and hold down the Drum Rotate button until the drum reaches the home position.
3. Confirm that the 13 mm diameter hole [A] in the gear [B] and the 8 mm diameter hole [C] in the side plate are lined up.
4. If the holes are not lined up, remove the E-rings [D] and reposition the gear.
5. Rotate the drum to the home position and do step 3 again.

9.6 TRANSPORT UNIT REMOVAL

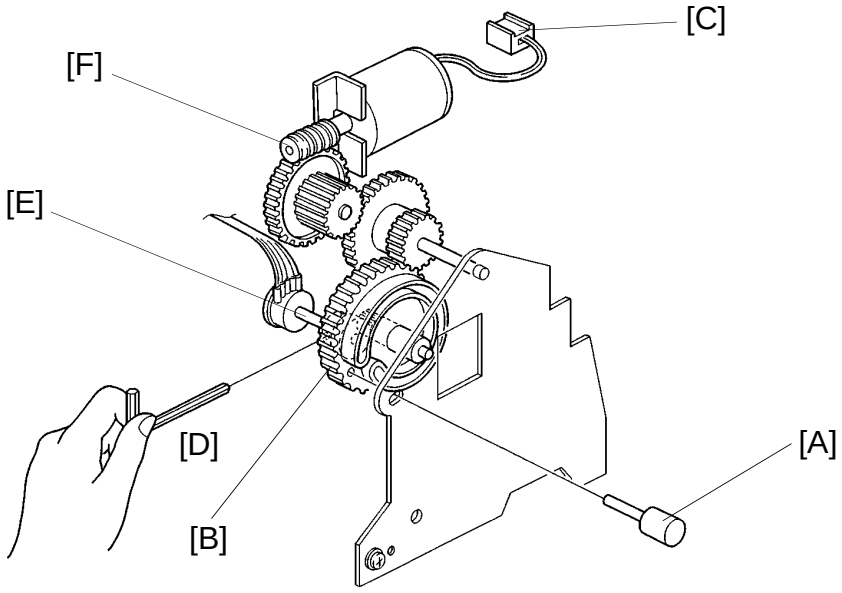


C223R591.img

1. Remove the right front cover and remove the inner cover.
2. Remove the exit side plate [A] (4 screws).
3. Remove the harness clamp and disconnect the two connectors [B].
4. Remove the two screws [C].
5. Take off the belt [D] from the pulley and remove the transport unit [E].

10. IMAGE POSIITONING

10.1 IMAGE POSITION ADJUSTMENT



C223R592.img

Purpose: To ensure that the image is well centered when the Image Position key is set to "0".

Adjustment Standard: The gauge [A] must be inserted.

1. Remove the rear cover.
2. Turn on the main switch. This way, the image position is returned exactly its initial position. (The image position indicator shows "0".)
3. Make sure that it is possible to insert the gauge [A] (P/N C2009002).
4. If the gauge [A] cannot be inserted into the hole in the gear [B], move the gear [B] to enable the gauge to be inserted into the hole as follows:
   a) Disconnect the image positioning motor connector [C].
   b) Loosen the Allen screw [D] so that the gear at the end of the image position sensor shaft [E] rotates freely.
   c) Turn the gear [B]. To do this, turn the worm gear [F] manually until the gauge [A] can be inserted into the hole in gear [B].

NOTE: Do not turn the image position sensor shaft [E]. If the shaft is turned, the image position indicator will be affected. If the indicator is affected, turn off the main switch, then turn it on again. This returns the indicator to "0".

5. Make some prints to check the image position.

⚠CAUTION:

Do not keep on pressing the Image Position key if the image position sensor is broken or removed. The plastic gears between the worm gear [F] and gear [B] may break if the pin which moves along the spiral track of the gear [B] hits the end of the track.

SECTION 6

TROUBLESHOOTING

1. ELECTRICAL COMPONENT PROBLEMS

Component	Condition	Symptom
FU1 (Power Supply Unit)	Open	The machine does not work. (No indicators on the operation panel turn on.)
FU2 (Power Supply Unit)	Open	When the main switch is turned on, "E-11" is displayed.
FU3 (Power Supply Unit)	Open	When the main switch is turned on, "E-13" is displayed.
FU4 (Power Supply Unit)	Open	The door open condition cannot be released.
FU101 (Main PCB)	Open	When the Print Start key is pressed, paper is not fed and jam indicators "B" and blink. When the Master Making key is pressed, the master is not ejected and jam indicators "F" and blink.
FU102 (Main PCB)	Open	If the master is wrapped around the drum, when the Master Making key is pressed, the master is not ejected and jam indicators "F" and blink. If the master is not wrapped around the drum, when the Master Making key is pressed, the master is not wrapped around the drum and jam indicators "C" and blink.
FU301 (AC drive board)	Open	The door open condition cannot be released.
Master Eject Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "F" and blink.
	OFF condition (Not activated)	When the master is being ejected, the jam indicators "F" and blink.
Full Master Box Sensor	ON condition (Not interrupted)	When the master eject box is full, the indicator does not blink.
	OFF condition (Interrupted)	After master ejecting is finished, the indicator blinks.
Paper Table Lower Limit Sensor	ON condition (Interrupted)	The paper table does not go down.
	OFF condition (Not interrupted)	When the paper feed table goes down and stops, the cover open indicator blinks.
Paper Table Safety Switch	ON condition (Feeler is actuated)	When the main switch is turned on, the cover open indicator blinks.
	OFF condition (Feeler is not actuated)	The paper feed safety bar does not work. If the paper table lower limit sensor is faulty, the paper table moves all the way down and locks.

Trouble-shooting

Component	Condition	Symptom
Paper Table Height Sensor	ON condition (Interrupted)	When the paper feed table goes up, it does not stop at the proper position and E-02 lights.
	OFF condition (Not interrupted)	The paper feed table does not go up. Jam indicators "B" and blink when the Print key is pressed.
Paper End Sensor	ON condition (Activated)	When there is no paper on the paper feed table, the Print Start key can be used, but jam indicators "B" and blink.
	OFF condition (Not activated)	Though there is paper on the paper table, the paper end indicator blinks.
Printing Pressure Sensor	ON condition (Interrupted)	Jam indicators "B" and blink after a trial print and the paper stops on the transport unit.
	OFF condition (Not interrupted)	Jam indicators "E" and blink when the main switch is turned on. Drum rotation does not stop after the Reset key is pressed.
First Paper Exit Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "G" and blink.
	OFF condition (Not activated)	Jam indicators "B", "E", and blink after one sheet of paper has been fed out.
Second Paper Exit Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "G" and blink.
	OFF condition (Not activated)	Jam indicators "E" and blink after one sheet of paper has been fed out.
Drum Rotation Sensor	ON condition (Interrupted)	When the Print Start key or the Master Making key is pressed, E-06 is indicated.
	OFF condition (Not interrupted)	Same as the above symptom.
Master End Sensor	ON condition (Activated)	Normal operation when master paper is present. Master end is not detected: Master End indicators "C" and do not blink and jam indicators "C" and blink.
	OFF condition (Not activated)	Even if master paper is present, the Master End indicators "C" and blink.
Right Cutter Switch (Rear)	ON condition (Feeler is actuated)	The master is not cut. (The cutter unit does not move at all.)
	OFF condition (Feeler is not actuated)	When the master is cut, E-01 is indicated. At that time, the cutter does not return to the front.

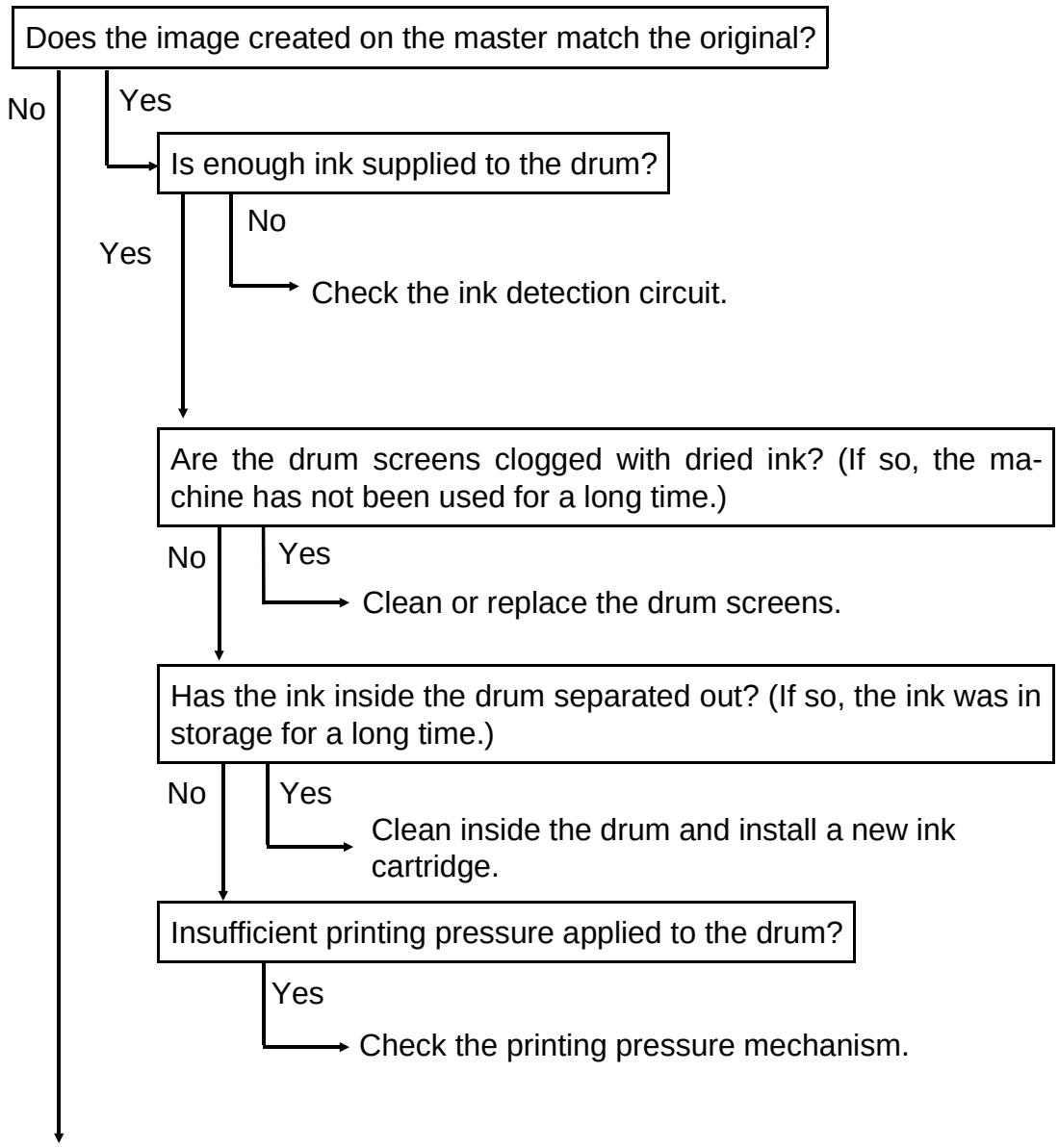
Component	Condition	Symptom
Left Cutter Switch (Front)	ON condition (Feeler is actuated)	The master is not cut. (The cutter unit does not return from the rear.)
	OFF condition (Feeler is not actuated)	When the main switch is turned on, E-01 is indicated.
First Drum Position Sensor	OFF condition (Not interrupted)	When the main switch is turned on, the drum starts rotating and it does not stop.
	ON condition (Interrupted)	1) Jam indicators "B" and blink when the Print key is pressed. The drum cannot be removed. 2) Jam indicator C + blink after the Master Making key is pressed. The drum cannot be removed.
Second Drum Position Sensor	OFF condition (Not interrupted)	1) When the Print key is pressed, paper is not fed but the drum rotates and never stops. 2) Master Eject jam is detected after the Master Making key is pressed.
	ON condition (Interrupted)	1) When the Print key is pressed, paper is not fed but the drum rotates and never stops. 2) Master Eject jam is detected after the Master Making key is pressed.
Master Buckle Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "C" and blink and cannot be reset.
	OFF condition (Not activated)	When the Master Making key is pressed, the original stops halfway, and jam indicators "A", "C", and blink.
Upper Pressure Plate Sensor	ON condition (Not interrupted)	When the main switch is turned on, the pressure plate keeps moving up and down. Then "E-12" is displayed.
	OFF condition (Interrupted)	After master making is finished and one sheet of paper has been delivered, lights. The pressure plate stops at the lower position.
Lower Pressure Plate Sensor	ON condition (Interrupted)	After master making is finished and one sheet of paper has been delivered, lights.
	OFF condition (Not interrupted)	During the master eject process, the machine stops and E-12 is displayed.
Paper Width Sensor 0	ON (Activated)	The machine cannot detect the correct paper size.
	OFF (Not activated)	
Paper Width Sensor 1	ON (Activated)	The machine cannot detect the correct paper size.
	OFF (Not activated)	

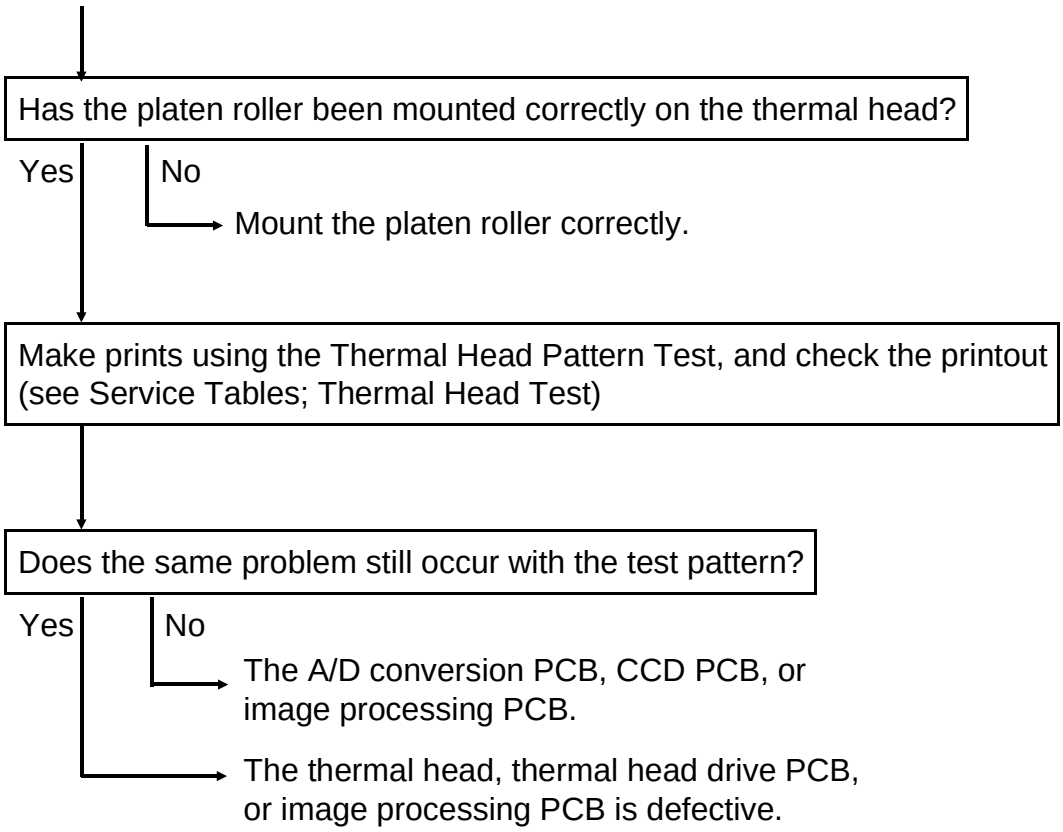
Component	Condition	Symptom
Paper Width Sensor 2	ON (Activated)	The machine cannot detect the correct paper size.
	OFF (Not activated)	
Paper Width Sensor 3	ON (Activated)	The machine cannot detect the correct paper size.
	OFF (Not activated)	
Paper Length Sensor [G]	ON (Activated)	A3 paper is detected even though A4 sideways paper is on the paper table.
	OFF (Not activated)	A4 sideways paper is detected even though A3 paper is on the paper table.
Drum Master Sensor	Always ON (Sensor always detects white)	**If a master is on the drum:** The machine works correctly. **If no master is on the drum:** Indicators "F" and blink during the master eject process. Printing starts when the Print Start key is pressed, but indicators "E", "B", and soon turn on and the machine stops.
	OFF (Sensor always detects black)	**If a master is on the drum:** Two masters are wrapped on the drum. **If no master is on the drum:** The master is wrapped correctly on the drum, but the "M" indicator blinks when the Print Start key is pressed.
Platen Cover Position Sensor	ON condition (Interrupted)	The shadow erase function does not work even if the platen cover is opened more than 25 degrees.
	OFF condition (Not interrupted)	The shadow erase function works regardless of whether the platen cover is opened or not.
Scanner Home Position Sensor	ON condition (Not interrupted)	"E-13" is displayed when the main switch is turned on.
	OFF condition (Interrupted)	"E-13" is displayed when the main switch is turned on.
Original Sensor	On condition (Activated)	The Master Making key is accepted even if an original has not been placed on the exposure glass.
	ON condition (Not activated)	"SET THE ORIGINALS" is displayed when the Master Making key is pressed even if an original has been placed on the exposure glass.

2. IMAGE AND PAPER FEED PROBLEMS

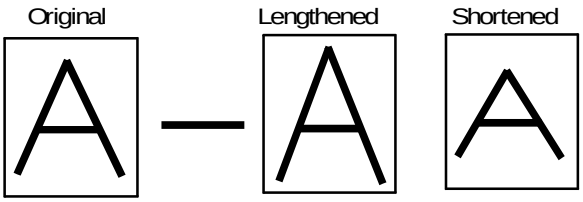
2.1 IMAGE QUALITY PROBLEMS

1. No image, white lines, uneven image on copies


Does the image created on the master match the original?
No
Yes
Is enough ink supplied to the drum?
Yes
No
Check the ink detection circuit.
Are the drum screens clogged with dried ink? (If so, the machine has not been used for a long time.)
No
Yes
Clean or replace the drum screens.
Has the ink inside the drum separated out? (If so, the ink was in storage for a long time.)
No
Yes
Clean inside the drum and install a new ink cartridge.
Insufficient printing pressure applied to the drum?
Yes
Check the printing pressure mechanism.


Has the platen roller been mounted correctly on the thermal head?
Yes
No
Mount the platen roller correctly.
Make prints using the Thermal Head Pattern Test, and check the printout (see Service Tables; Thermal Head Test)
Does the same problem still occur with the test pattern?
Yes
No
The A/D conversion PCB, CCD PCB, or image processing PCB.
The thermal head, thermal head drive PCB, or image processing PCB is defective.

2. The printed image is enlarged or reduced in the paper feed direction



Is the printed image larger than the original in the paper feed direction?

No

Yes

Is the scanner motor functioning normally?

Yes

No

Check the scanner motor.

Are the drive belts in the original feed section adjusted to the correct tension?

Yes

No

Adjust the belt tension by loosening and tightening the belt tension bracket screws (see Replacement & Adjustment; Scanner Timing Belts).

Are any of the pulleys and/or gears in the original feed section loose?

No

Tighten the screws securing the pulleys and/or gears.

Is the printed image smaller than the original in the paper feed direction?

Yes

Is the master feed motor functioning normally?

Yes

No

Check the master feed motor.

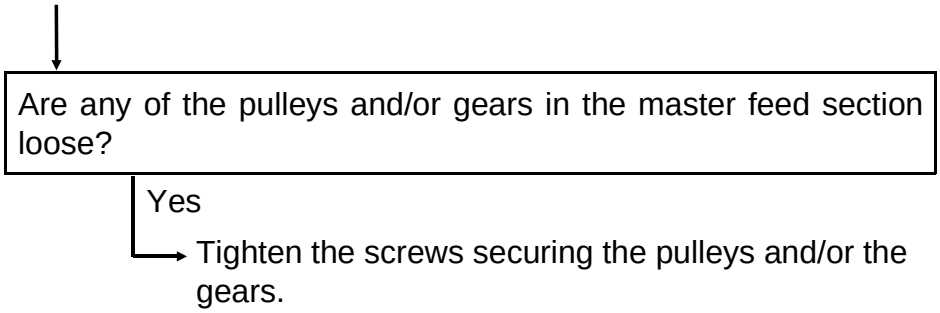
Are the drive belts in the master feed section adjusted to the correct tension?

Yes

No

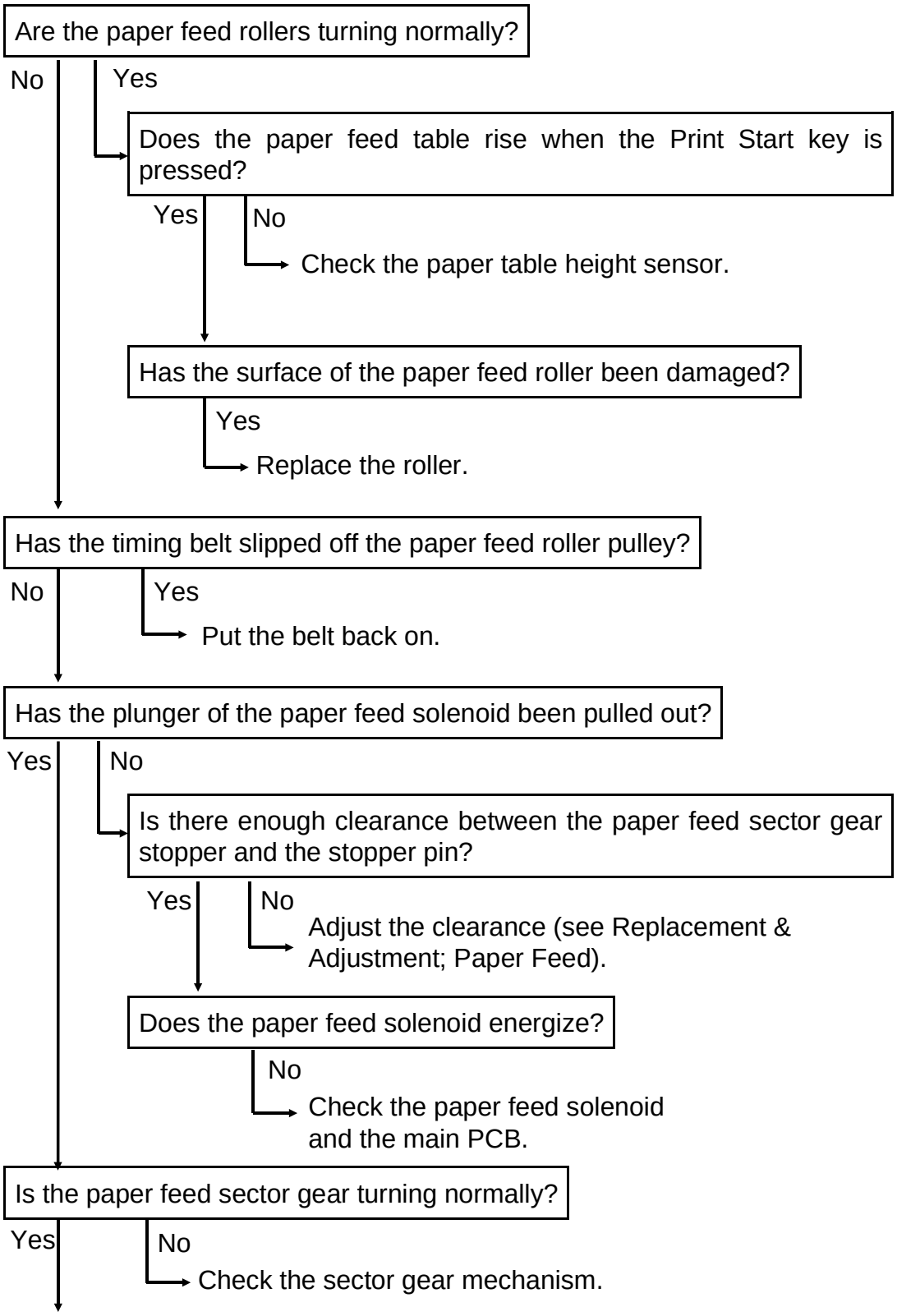
Adjust the belt tension (see Replacement & Adjustment; Master Feed).

Trouble-shooting


Are any of the pulleys and/or gears in the master feed section loose?
Yes
Tighten the screws securing the pulleys and/or the gears.

2.2 PAPER FEED PROBLEMS

1. No paper is fed from the paper table

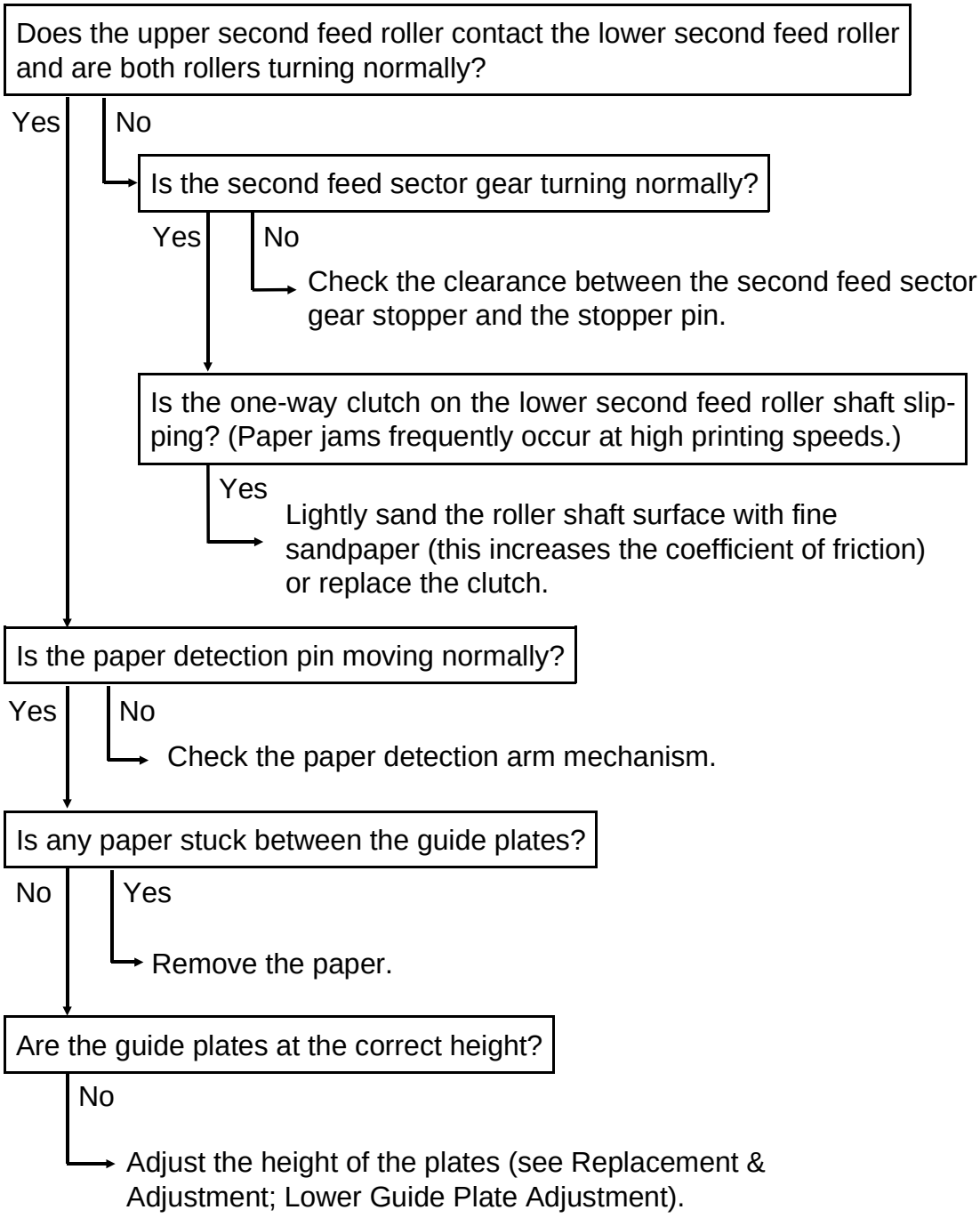

Are the paper feed rollers turning normally?
No
Yes
Does the paper feed table rise when the Print Start key is pressed?
Yes
No
Check the paper table height sensor.
Has the surface of the paper feed roller been damaged?
Yes
Replace the roller.
Has the timing belt slipped off the paper feed roller pulley?
No
Yes
Put the belt back on.
Has the plunger of the paper feed solenoid been pulled out?
Yes
No
Is there enough clearance between the paper feed sector gear stopper and the stopper pin?
Yes
No
Adjust the clearance (see Replacement & Adjustment; Paper Feed).
Does the paper feed solenoid energize?
No
Check the paper feed solenoid and the main PCB.
Is the paper feed sector gear turning normally?
Yes
No
Check the sector gear mechanism.

Is the one-way clutch on the paper feed roller shaft slipping? (Paper is often not fed forward at high printing speeds.)

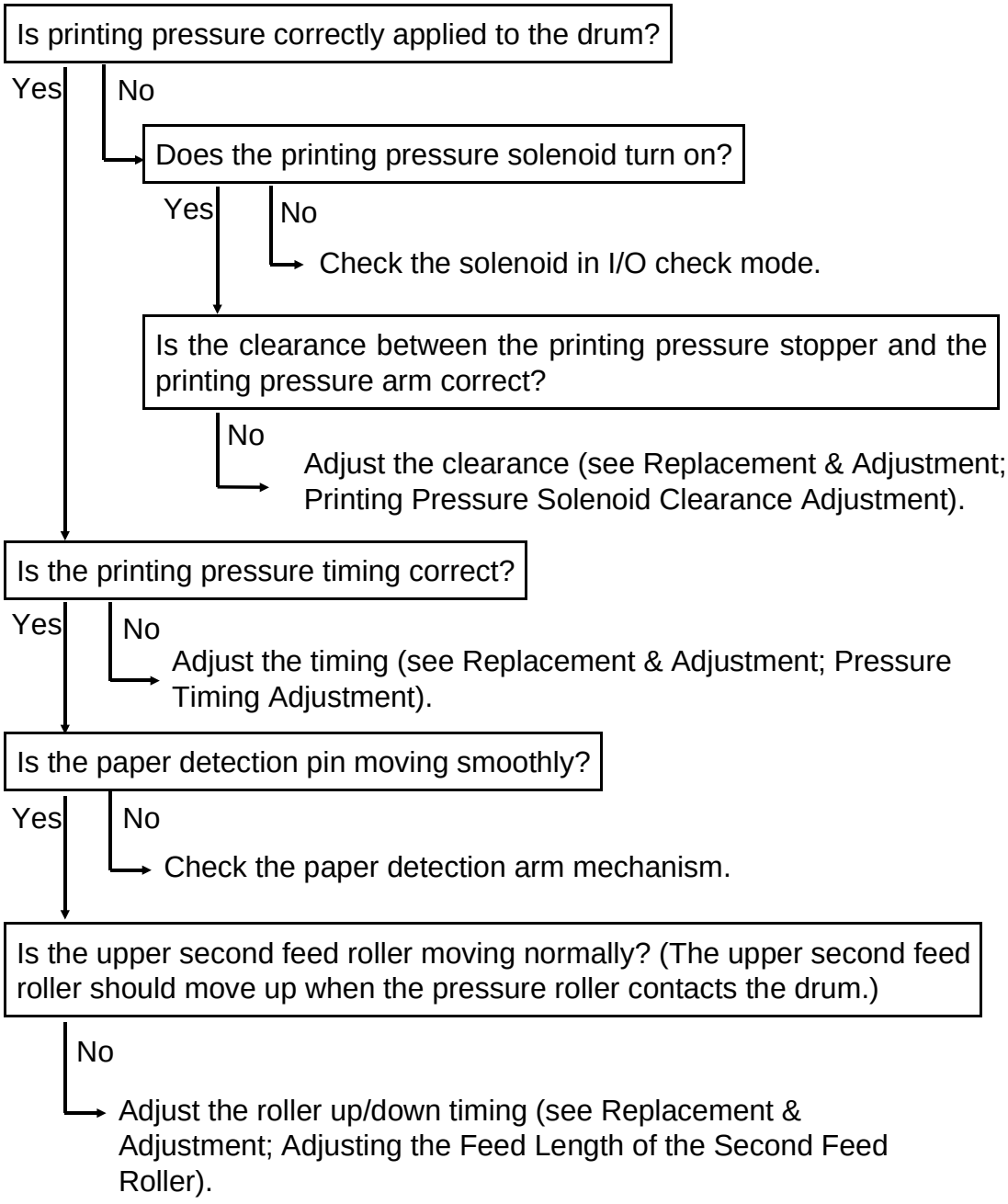
Yes

→ Lightly sand the roller shaft surface with fine sandpaper (this increases the coefficient of friction) or replace the clutch.

2. The paper's leading edge jams under the second feed roller


Does the upper second feed roller contact the lower second feed roller and are both rollers turning normally?
Yes
No
Is the second feed sector gear turning normally?
Yes
No
Check the clearance between the second feed sector gear stopper and the stopper pin.
Is the one-way clutch on the lower second feed roller shaft slipping? (Paper jams frequently occur at high printing speeds.)
Yes
Lightly sand the roller shaft surface with fine sandpaper (this increases the coefficient of friction) or replace the clutch.
Is the paper detection pin moving normally?
Yes
No
Check the paper detection arm mechanism.
Is any paper stuck between the guide plates?
No
Yes
Remove the paper.
Are the guide plates at the correct height?
No
Adjust the height of the plates (see Replacement & Adjustment; Lower Guide Plate Adjustment).

3. The paper's leading edge jams under the drum


Is printing pressure correctly applied to the drum?
Yes
No
Does the printing pressure solenoid turn on?
Yes
No
Check the solenoid in I/O check mode.
Is the clearance between the printing pressure stopper and the printing pressure arm correct?
No
Adjust the clearance (see Replacement & Adjustment; Printing Pressure Solenoid Clearance Adjustment).
Is the printing pressure timing correct?
Yes
No
Adjust the timing (see Replacement & Adjustment; Pressure Timing Adjustment).
Is the paper detection pin moving smoothly?
Yes
No
Check the paper detection arm mechanism.
Is the upper second feed roller moving normally? (The upper second feed roller should move up when the pressure roller contacts the drum.)
No
Adjust the roller up/down timing (see Replacement & Adjustment; Adjusting the Feed Length of the Second Feed Roller).

4. Paper frequently jams or is not fed during high speed printing (but not at low printing speeds)

Is the surface of the paper feed roller damaged or defective?

No

Yes → Replace the roller.

Is the timing belt of the paper feed roller slipping?

No

Yes → Adjust the belt tension.

Is the one-way clutch on the paper feed roller shaft slipping?

No

Yes → Lightly sand the paper feed roller shaft with fine sandpaper or replace the one-way clutch.

Is there enough clearance between the paper detection arm and the pressure release arm?

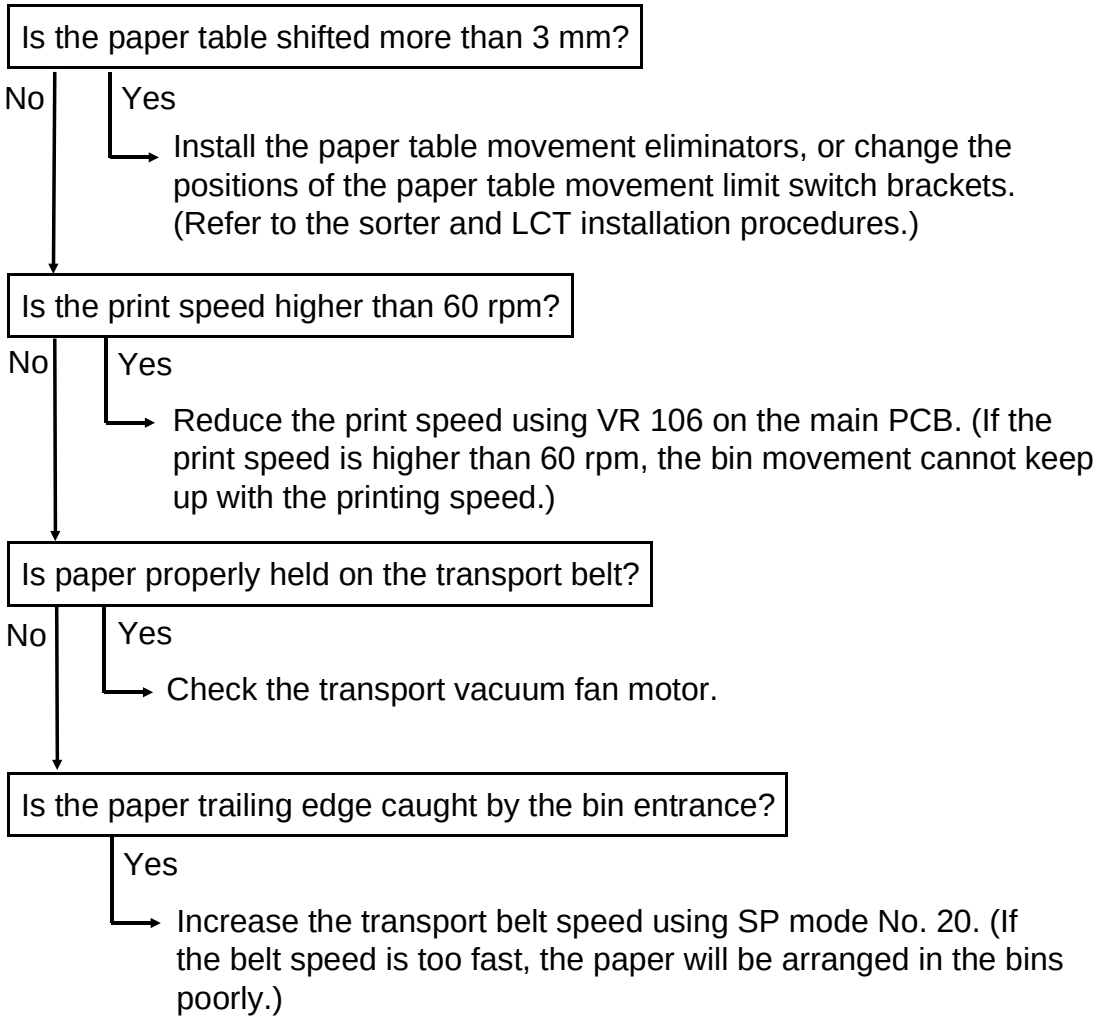
Yes

No → Adjust the clearance (see Replacement & Adjustment; Paper Detection Arm Clearance Adjustment).

Is the printing pressure cam timing correct? (If not, the maximum printing area cannot be created.)

No → Adjust the cam timing (see Replacement & Adjustment; Pressure Timing Adjustment).

5. Paper frequently jams at the sorter


Is the paper table shifted more than 3 mm?
No
Yes
Install the paper table movement eliminators, or change the positions of the paper table movement limit switch brackets. (Refer to the sorter and LCT installation procedures.)
Is the print speed higher than 60 rpm?
No
Yes
Reduce the print speed using VR 106 on the main PCB. (If the print speed is higher than 60 rpm, the bin movement cannot keep up with the printing speed.)
Is paper properly held on the transport belt?
No
Yes
Check the transport vacuum fan motor.
Is the paper trailing edge caught by the bin entrance?
Yes
Increase the transport belt speed using SP mode No. 20. (If the belt speed is too fast, the paper will be arranged in the bins poorly.)

RICOH

RICOH PRIPORT VT3800

PARTS CATALOG

First Edition November 1995

RICOH COMPANY, LTD.

PARTS CATALOG

INTRODUCTION

This chapter instructs you the numbers and names of parts on this machine.

INDEX to PARTS CATALOG

VT3800 (C223)
DF UNIT (C550)
DF UNIT TYPE 50 (C562)
SORTER TS20A/20B (C560/C561)
RT4000 (C563)
TAPE MARKER TYPE20 (C532)

VT3800 (C223)

PARTS CATALOG

INTRODUCTION

This chapter instructs you the numbers and names of parts on this machine.

INDEX to PARTS CATALOG

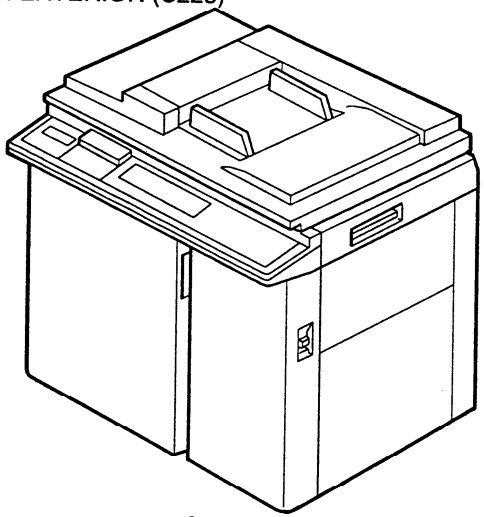
Location of Unit 3
1.EXTERIOR (C223) 10
2.PLATEN COVER (C223) 12
3.FRAME SECTION 1 (C223) 14
4.FRAME SECTION 2 (C223) 16
5.DRIVE SECTION 1 (C223) 18
6.DRIVE SECTION 2 (C223) 20
7.PAPER TABLE SECTION 1 (C223) 22
8.PAPER TABLE SECTION 2 (C223) 24
9.PAPER FEED ROLLER AND SEPARATION ROLLER(C223) 26
10.PAPER SEPARATION ROLLER (C223) 28
11.PAPER DELIVERY SECTION 1 (C223) 30
12.PAPER DELIVERY SECTION 2 (C223) 32
13.PAPER DELIVERY SECTION 3 (C223) 34
14.PAPER DELIVERY SECTION 4 (C223) 36
15.DELIVERY TABLE 1 (C223) 38
16.DELIVERY TABLE 2 (C223) 40
17.PAPER EXIT SECTION 1 (C223) 42
18.PAPER EXIT SECTION 2 (C223) 44
19.PAPER EXIT SECTION 3 (C223) 46
20.DRUM SECTION 1 (C223) 48
21.DRUM SECTION 2 (C223) 50
22.DRUM SECTION 3 (C223) 52
23.DRUM SECTION 4 (C223) 54
24.DRUM SECTION 5 (C223) 56
25.SCANNER SECTION 1 (C223) 58
26.SCANNER SECTION 2 (C223) 60
27.SCANNER SECTION 3 (C223) 62
28.SCANNER SECTION 4 (C223) 64
29.PLOTTER SECTION 1 (C223) 66
30.PLOTTER SECTION 2 (C223) 68
31.PLOTTER SECTION 3 (C223) 70
32.PLOTTER SECTION 4 (C223) 72
33.MASTER EJECT SECTION 1 (C223) 74
34.MASTER EJECT SECTION 2 (C223) 76

November,31’95

35.MASTER EJECT SECTION 3 (C223) 78
36.ELECTRICAL SECTION 1 (C223) 80
37.ELECTRICAL SECTION 2 (C223) 82
38.ACCESSORISE ANDSPECIAL TOOLS (C223) 84
39.CASSETTE (C223)..... 86
40.MAIN CONTROL BOARD (C223) 88
41.AC DRIVE BOARD (C223)..... 90
42.IMAGE PROCESSING BOARD (C223) 92
43.TABLE SECTION (C223) 94
44.DECAL AND DOCUMENT (C223) 96
PARTS INDEX 99

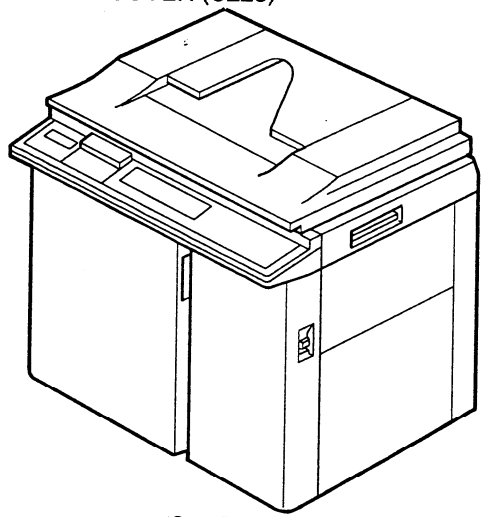
Location of Unit

1. EXTERIOR (C223)



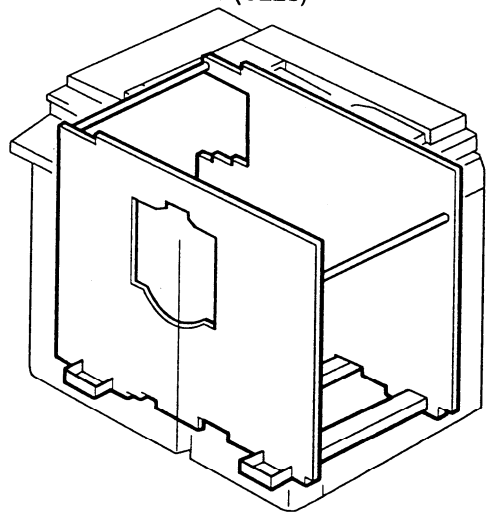
See Page 10

2. PLATEN COVER (C223)



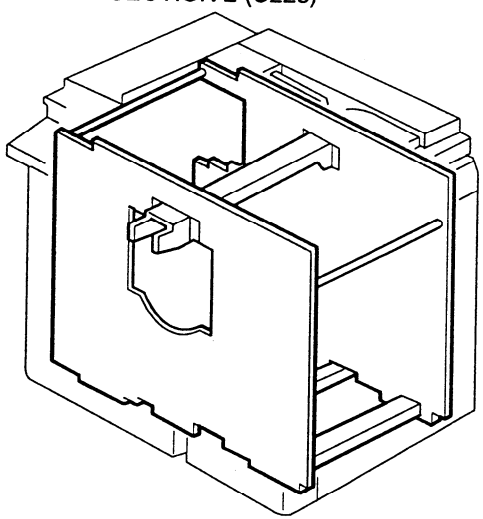
See Page 12

3. FRAME SECTION 1 (C223)



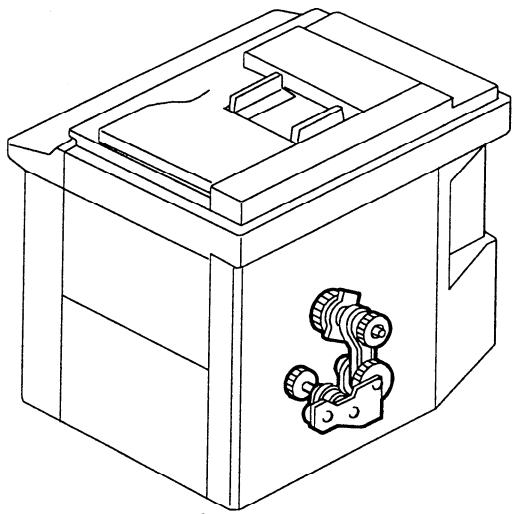
See Page 14

4. FRAME SECTION 2 (C223)



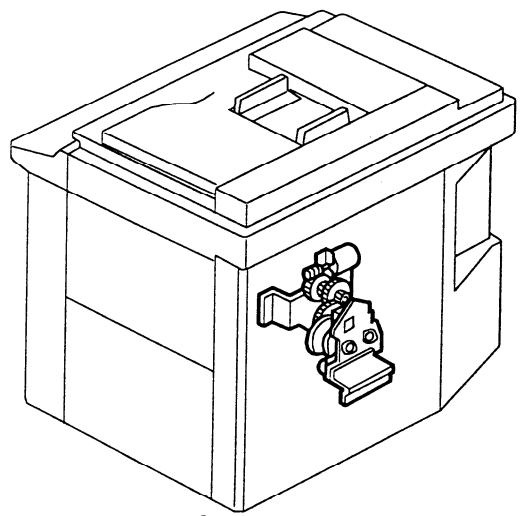
See Page 16

5. DRIVE SECTION 1 (C223)



See Page 18

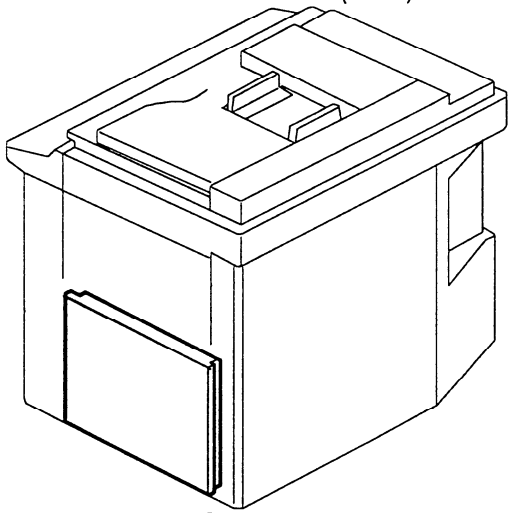
6. DRIVE SECTION 2 (C223)



See Page 20

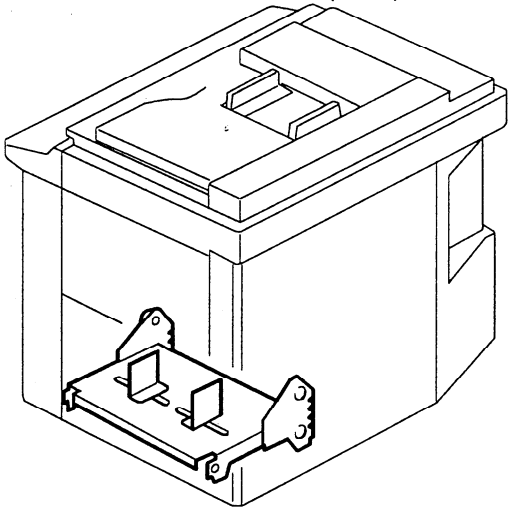
Location of Unit

7. PAPER TABLE SECTION 1 (C223)



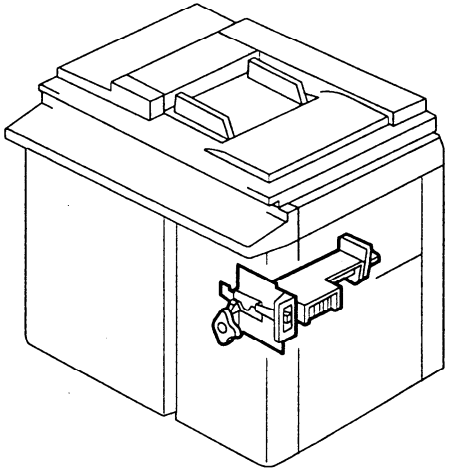
See Page 22

8. PAPER TABLE SECTION 2 (C223)



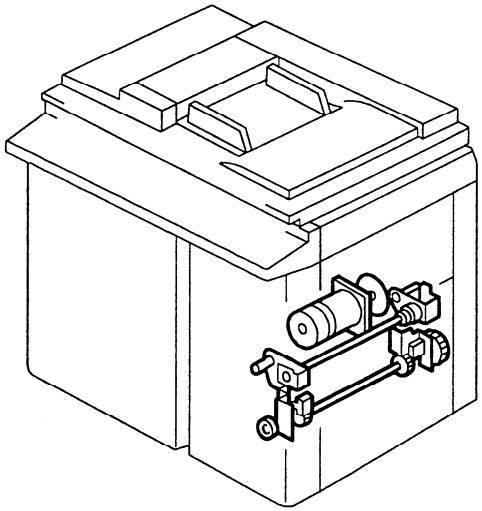
See Page 24

9. PAPER FEED ROLLER AND SEPARATION ROLLER(C223)



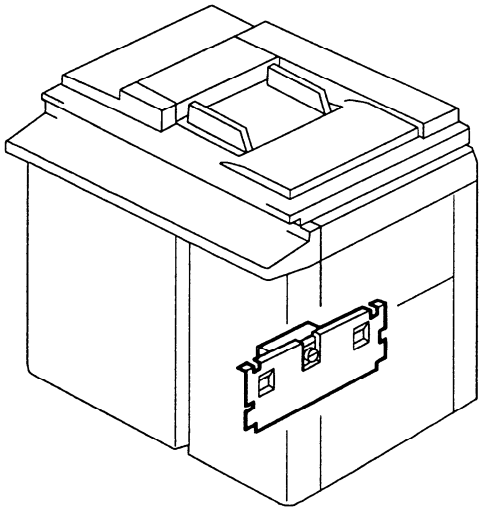
See Page 26

10. PAPER SEPARATION ROLLER (C223)



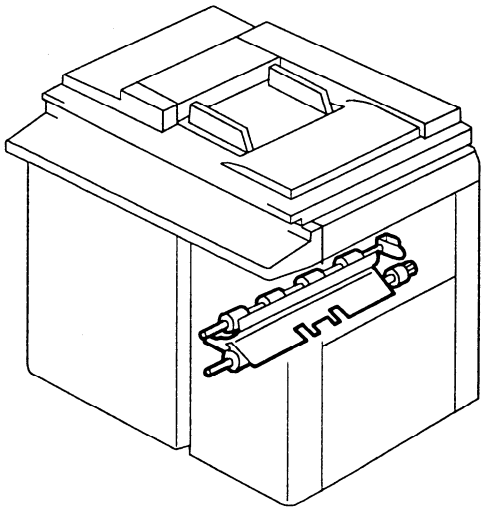
See Page 28

11. PAPER DELIVERY SECTION 1 (C223)



See Page 30

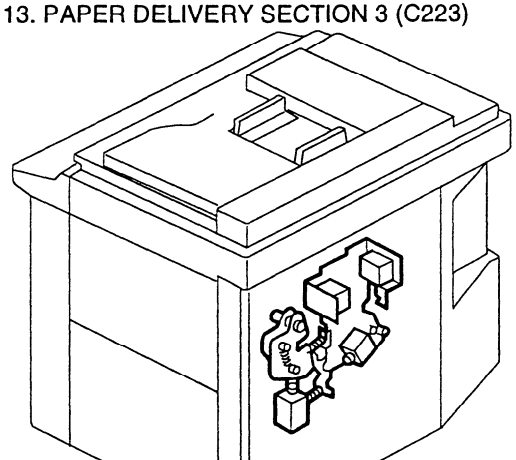
12. PAPER DELIVERY SECTION 2 (C223)



See Page 32

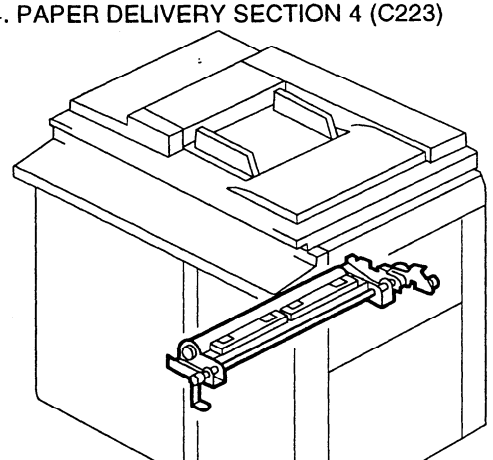
Location of Unit

13. PAPER DELIVERY SECTION 3 (C223)



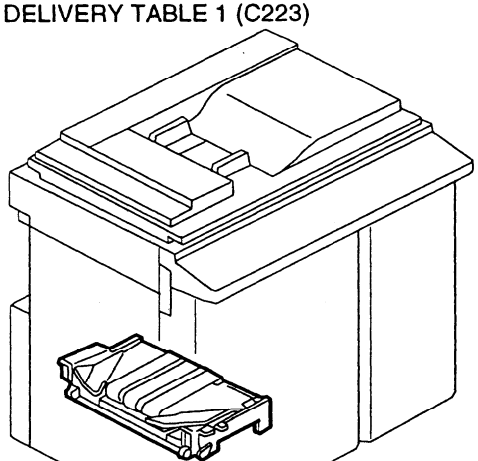
See Page 34

14. PAPER DELIVERY SECTION 4 (C223)



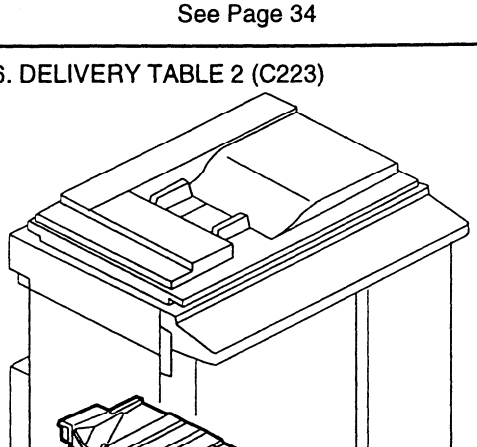
See Page 36

15. DELIVERY TABLE 1 (C223)



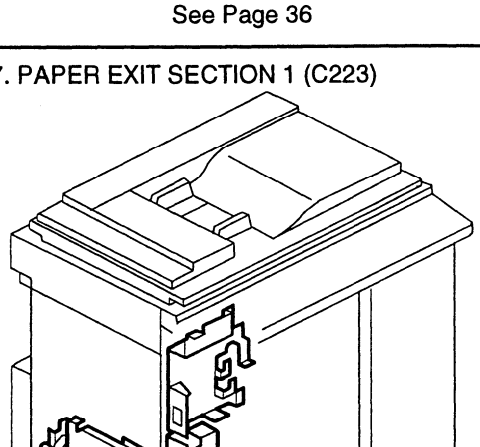
See Page 38

16. DELIVERY TABLE 2 (C223)



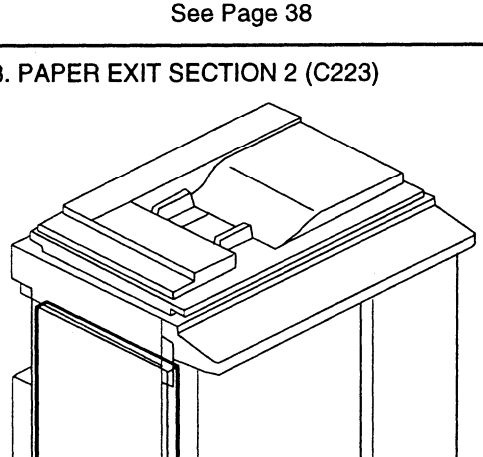
See Page 40

17. PAPER EXIT SECTION 1 (C223)



See Page 42

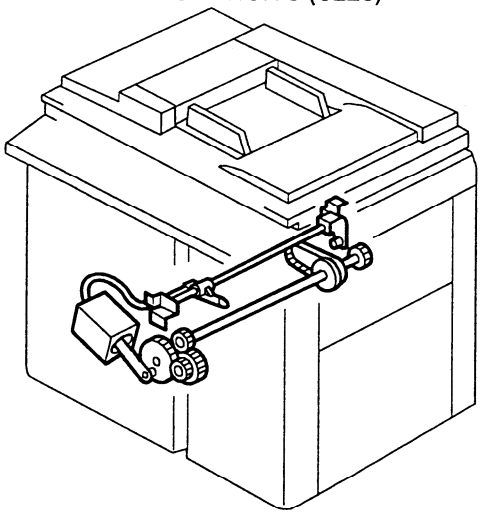
18. PAPER EXIT SECTION 2 (C223)



See Page 44

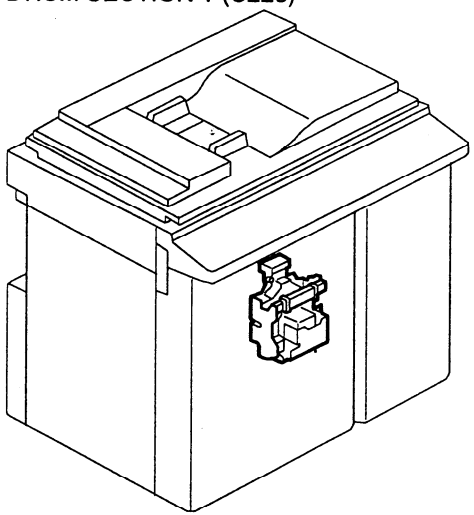
Location of Unit

19. PAPER EXIT SECTION 3 (C223)



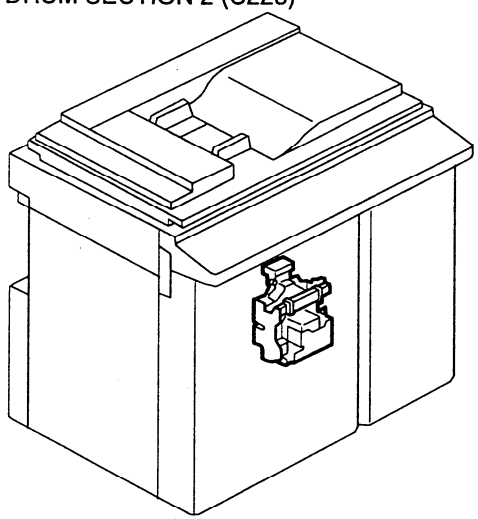
See Page 46

20. DRUM SECTION 1 (C223)



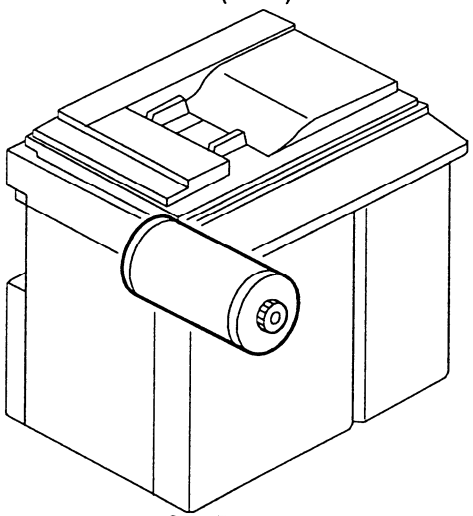
See Page 48

21. DRUM SECTION 2 (C223)



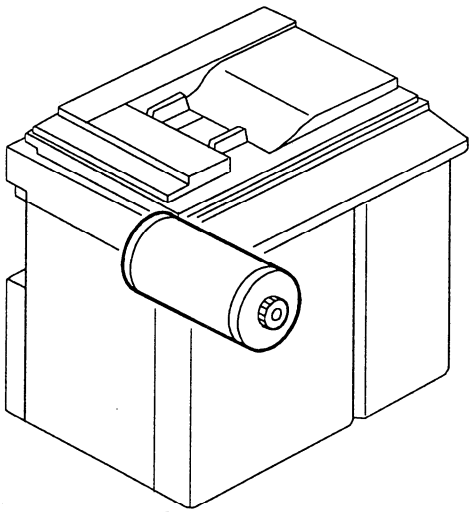
See Page 50

22. DRUM SECTION 3 (C223)



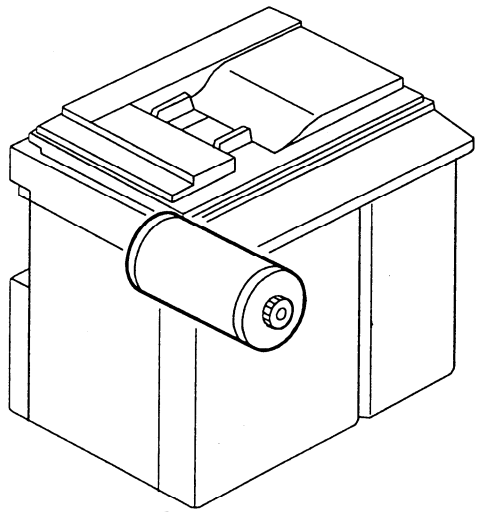
See Page 52

23. DRUM SECTION 4 (C223)



See Page 54

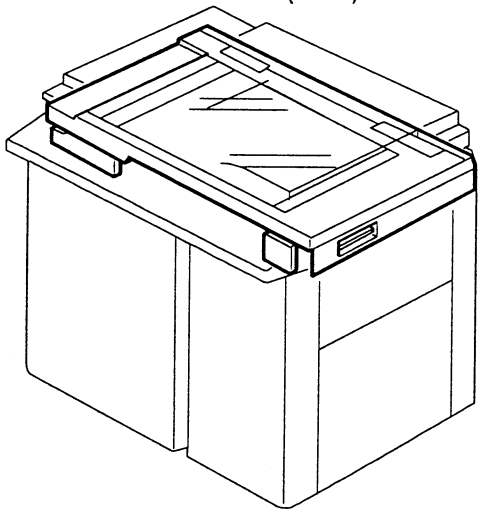
24. DRUM SECTION 5 (C223)



See Page 56

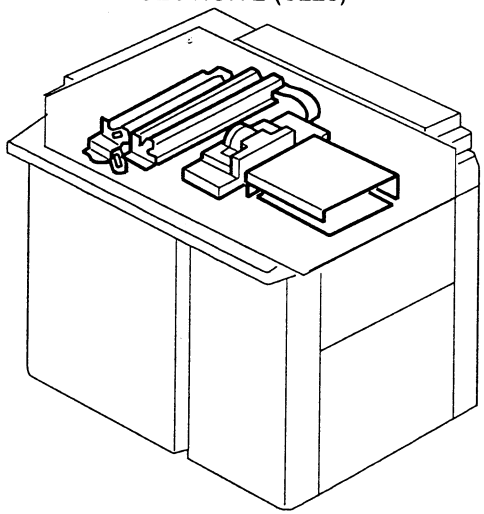
Location of Unit

25. SCANNER SECTION 1 (C223)



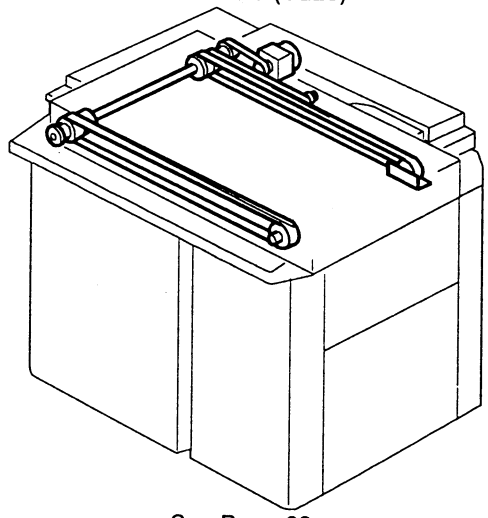
See Page 58

26. SCANNER SECTION 2 (C223)



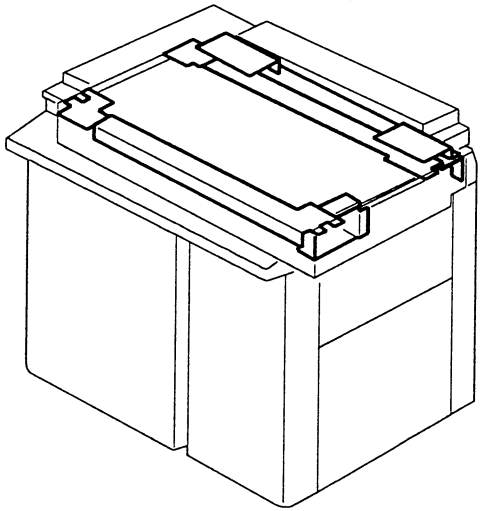
See Page 60

27. SCANNER SECTION 3 (C223)



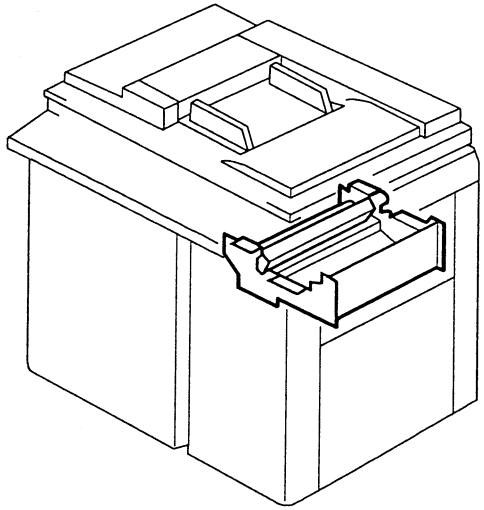
See Page 62

28. SCANNER SECTION 4 (C223)



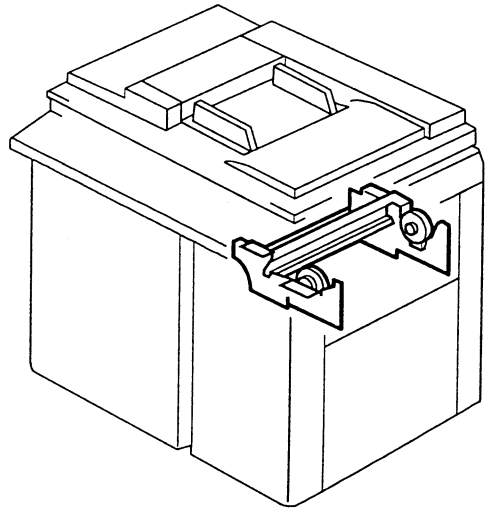
See Page 64

29. PLOTTER SECTION 1 (C223)



See Page 66

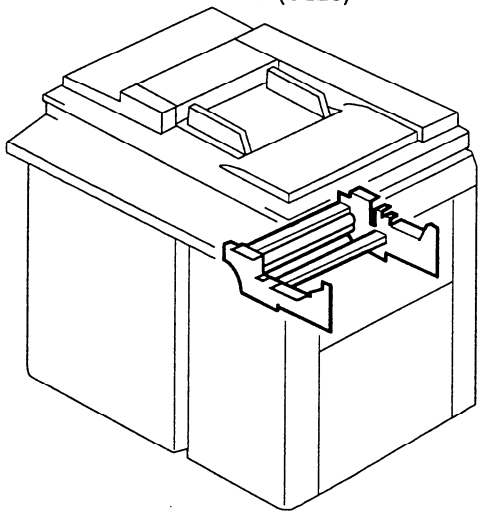
30. PLOTTER SECTION 2 (C223)



See Page 68

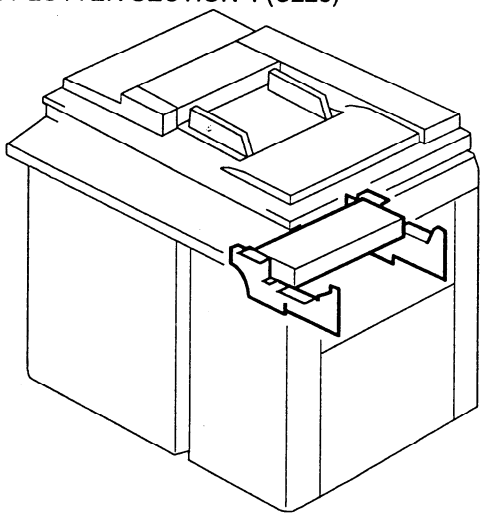
Location of Unit

31. PLOTTER SECTION 3 (C223)



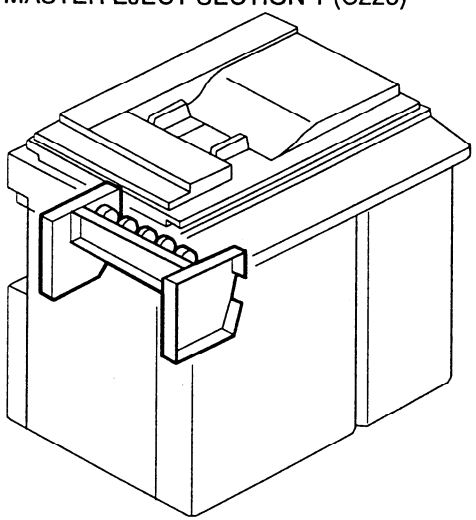
See Page 70

32. PLOTTER SECTION 4 (C223)



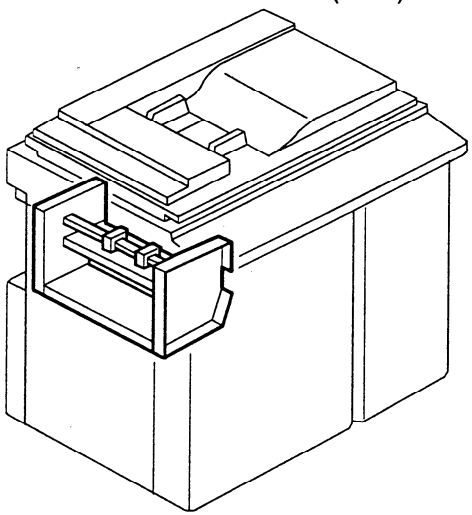
See Page 72

33. MASTER EJECT SECTION 1 (C223)



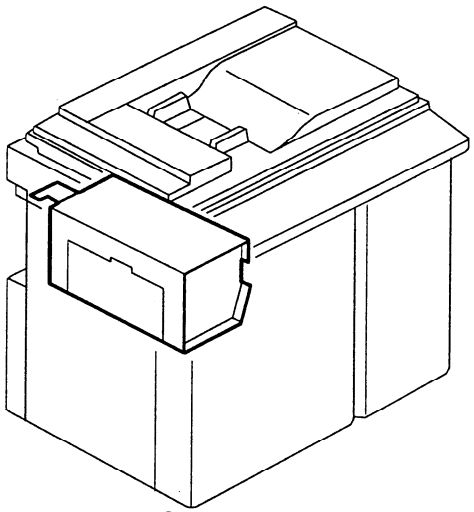
See Page 74

34. MASTER EJECT SECTION 2 (C223)



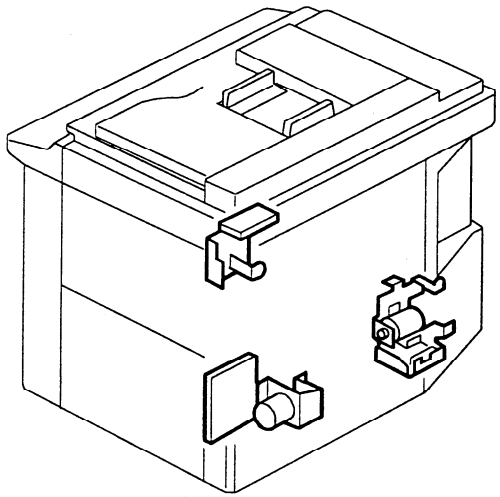
See Page 76

35. MASTER EJECT SECTION 3 (C223)



See Page 78

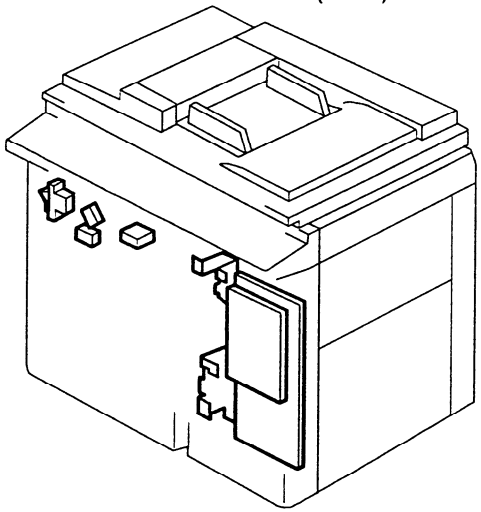
36. ELECTRICAL SECTION 1 (C223)



See Page 80

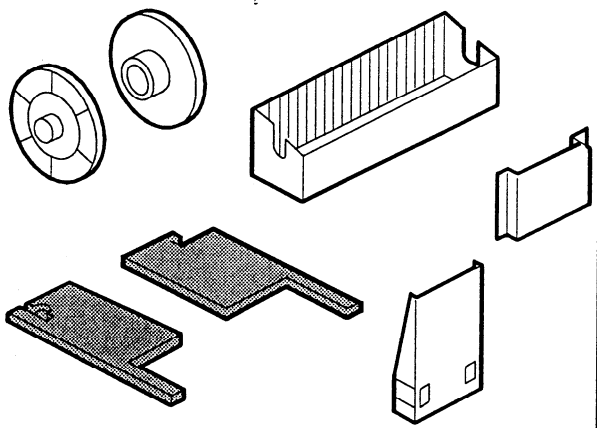
Location of Unit

37. ELECTRICAL SECTION 2 (C223)



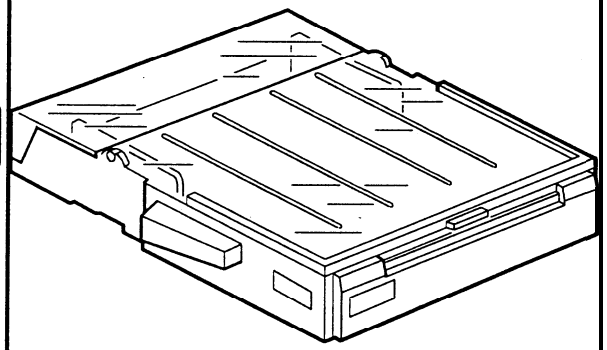
See Page 82

38. ACCESSORISE ANDSPECIAL TOOLS (C223)



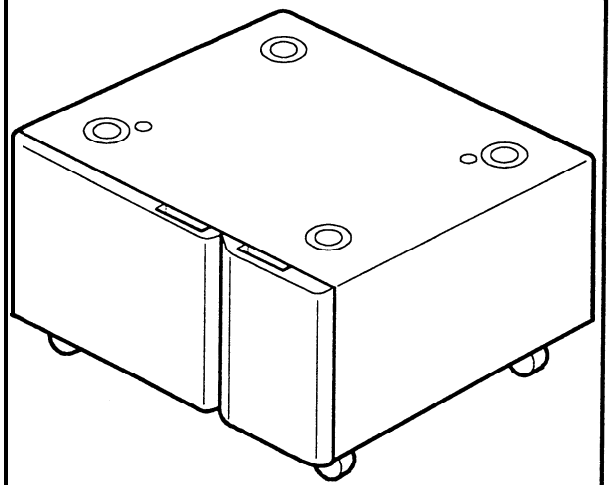
See Page 84

39. CASSETTE (C223)



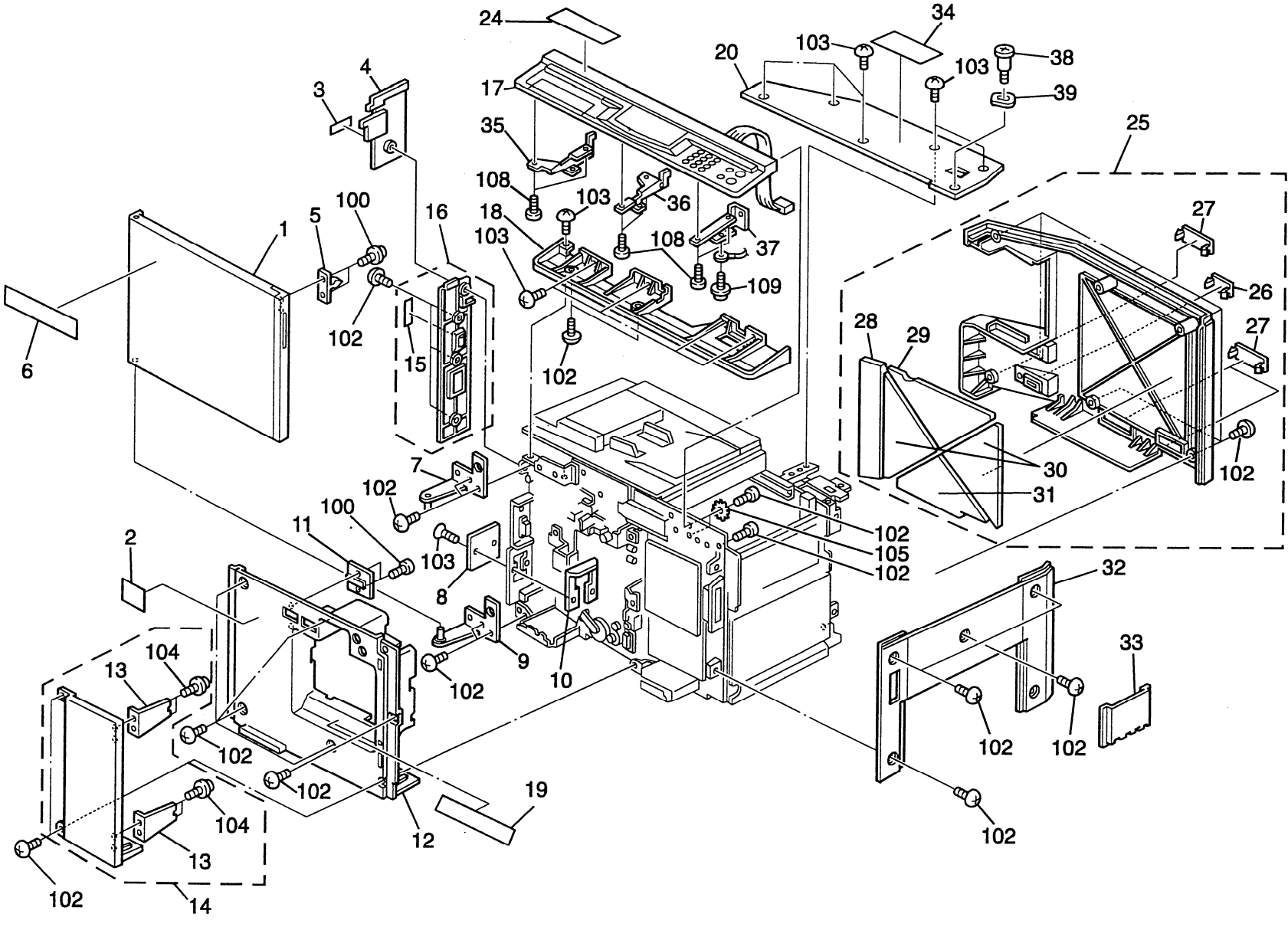
See Page 86

40. TABLE SECTION (C223)



See Page 98

1. EXTERIOR (C223)

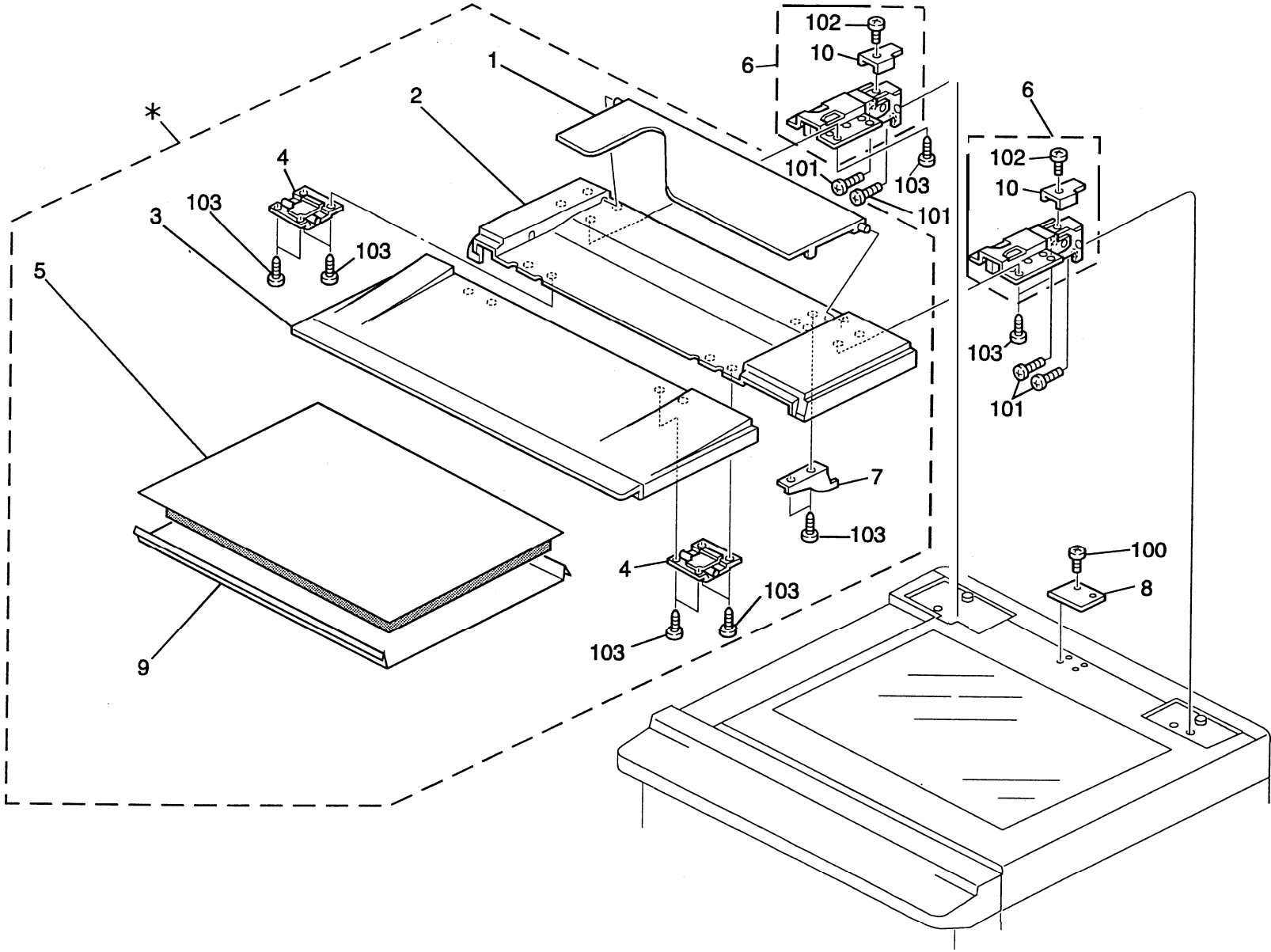


1. EXTERIOR (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 2424	Front Door Ass'y (RIC)	1
1	C222 2862	Front Door Ass'y (NRG)	1
1	C223 2921	Front Door Ass'y (SVN)	1
1	C218 2954	Front Door Ass'y (AB DICK)	1
2	C218 2816	Decal - Drum Replacement - LT	1
3	C218 2825	Decal - Master Eject Open	1
4	C218 2750	Front Left Cover	1
5	C209 2469	Door Catch	1
6	C223 2865	Model Name Plate - GES	1
6	C223 2866	Model Name Plate - REX	1
6	C223 2867	Model Name Plate - NSA	1
7	C209 2432	Upper Hinge Bracket	1
8	C217 2455	Key Counter Cover	1
9	C209 2435	Lower Hinge Bracket	1
10	A030 1339	Plate Nut - Key Counter	1
11	C209 2470	Left Cover Cap	1
12	C218 2803	Left Front Cover - LT	1
12	C218 2832	Left Front Cover (A4)	1
13	C209 2411	Right Cover Support Bracket	2
14	C223 2810	Front Cover Ass'y (RIC)	1
14	C222 2860	Front Cover Ass'y (NRG)(SVN)	1
14	C223 2910	Front Cover Ass'y (AB DICK)	1
15	C217 2514	Decal - Main Switch	1
16	C218 2809	Main Switch Cover	1
17	C223 2801	Operation Panel Ass'y (LT)	1
17	C223 2831	Operation Panel Ass'y (A4)	1
18	C218 2405	Lower Cover- Operation Panel	1
19	C218 2817	Decal - Replacement	1
20	C222 2811	Rear Upper Cover	1
24	A153 6409	Decal Key-top Cover (GES)	1
24	C225 2866	Decal Key-top Cover (REX)	1
24	C225 2867	Decal Key-top Cover (NSA)	1
25	C223 2812	Rear Cover Ass'y	1
26	C217 2453	Rear Cover Cap- Small	1
27	C217 2454	Rear Cover Cap- Large	2

Index No.	Part No.	Description	Q'ty Per Assembly
28	C221 2575	Large Pad - Rear Cover	1
29	C209 2572	Upper Pad - Rear Cover	1
30	C209 2574	Side Pad - Rear Cover	2
31	C221 2573	Lower Pad - Rear Cover	1
32	C218 2450	Right Cover	1
33	C219 2705	Original Holder	1
34	C222 2552	Decal - Master Set	1
35	C222 2120	Left Bracket - Operation Panel	1
36	C222 2121	Middle Bracket - Operation Panel	1
37	C222 2122	Right Bracket - Operation Panel	1
38	C218 2525	Stepped Screw - M4	1
39	C217 5102	Spring Washer	1
100	0965 3006Z	Tapping Screw With Flat Washer-M3x6	
102	0344 0080D	Philips Truss Head Screw - M4x8	
103	0333 0080D	Philips Counter Sunk Screw - M3x8	
104	0965 4008W	Tapping Screw With Flat Washer-M4x8	
105	0705 0040B	Toothed Washer	
108	0802 5097	Tapping Screw - M3x10	
109	0951 4006Z	Philips Screw With Flat Washer M4x6	

2. PLATEN COVER (C223)

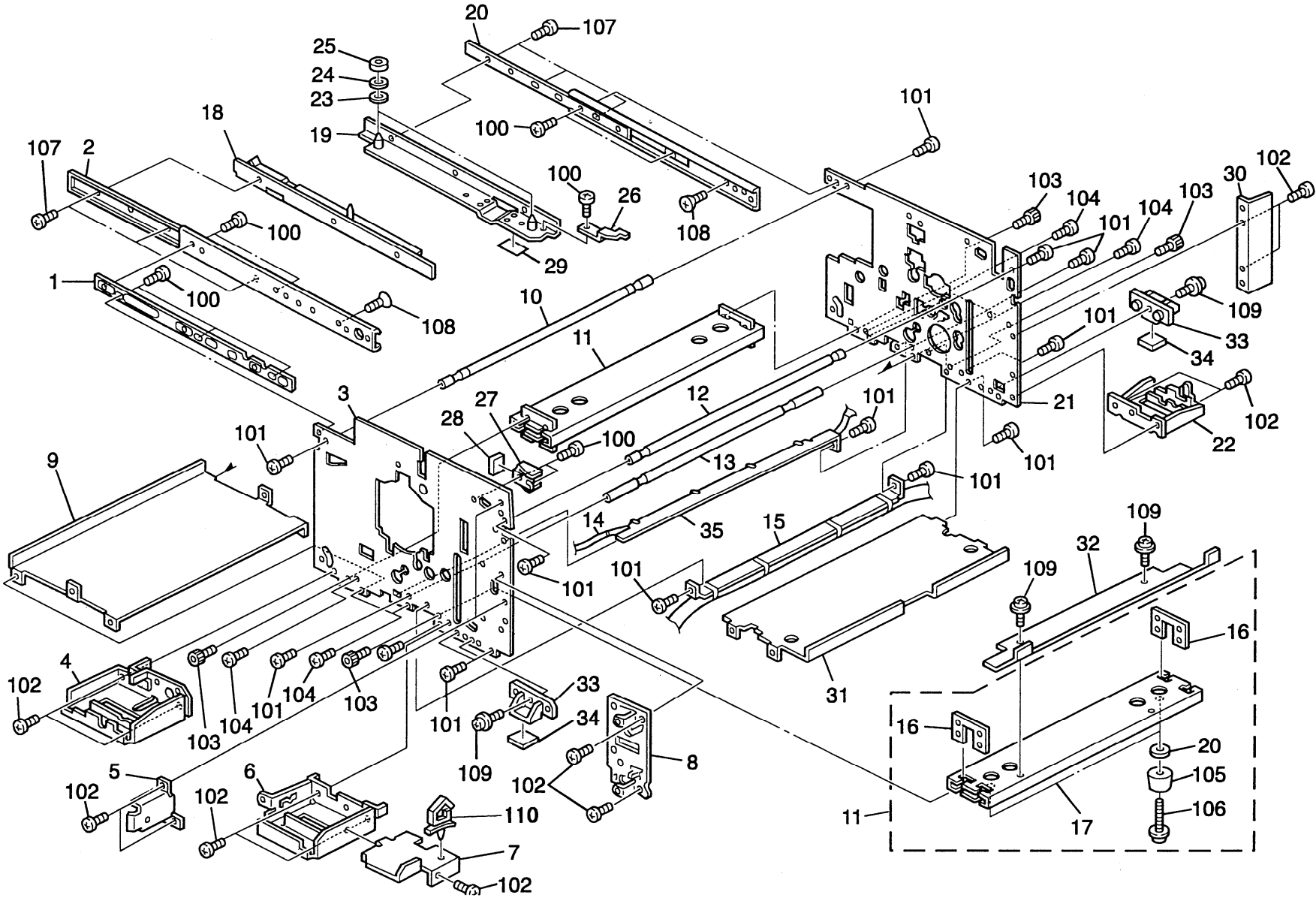


2. PLATEN COVER (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C218 2807	Platen Cover Ass'y	1
1	C219 2705	Original Holder	1
2	C219 2704	Rear Platen Cover	1
3	C219 2702	Front Platen Cover	1
4	5448 2824	Flex Hinge - Platen Cover	2
5	AA16 2053	Platen Cover Pad	1
6	C219 2710	Platen Cover Hinge	2
7	C219 2706	Platen Cover Sensor Actuator	1
8	C219 3473	Interface Cover	1
9	C219 2708	Platen Cover Sheet	1
10	C219 2711	Hinge Stopper	2

Index No.	Part No.	Description	Q'ty Per Assembly
100	0801 1004	Screw - M4X4	
101	0314 0060W	Philips Pan Head Screw - M4x6	
102	0313 0050W	Philips Pan Head Screw - M3x5	
103	0452 4012Z	Tapping Screw - M4x12	

3. FRAME SECTION 1 (C223)

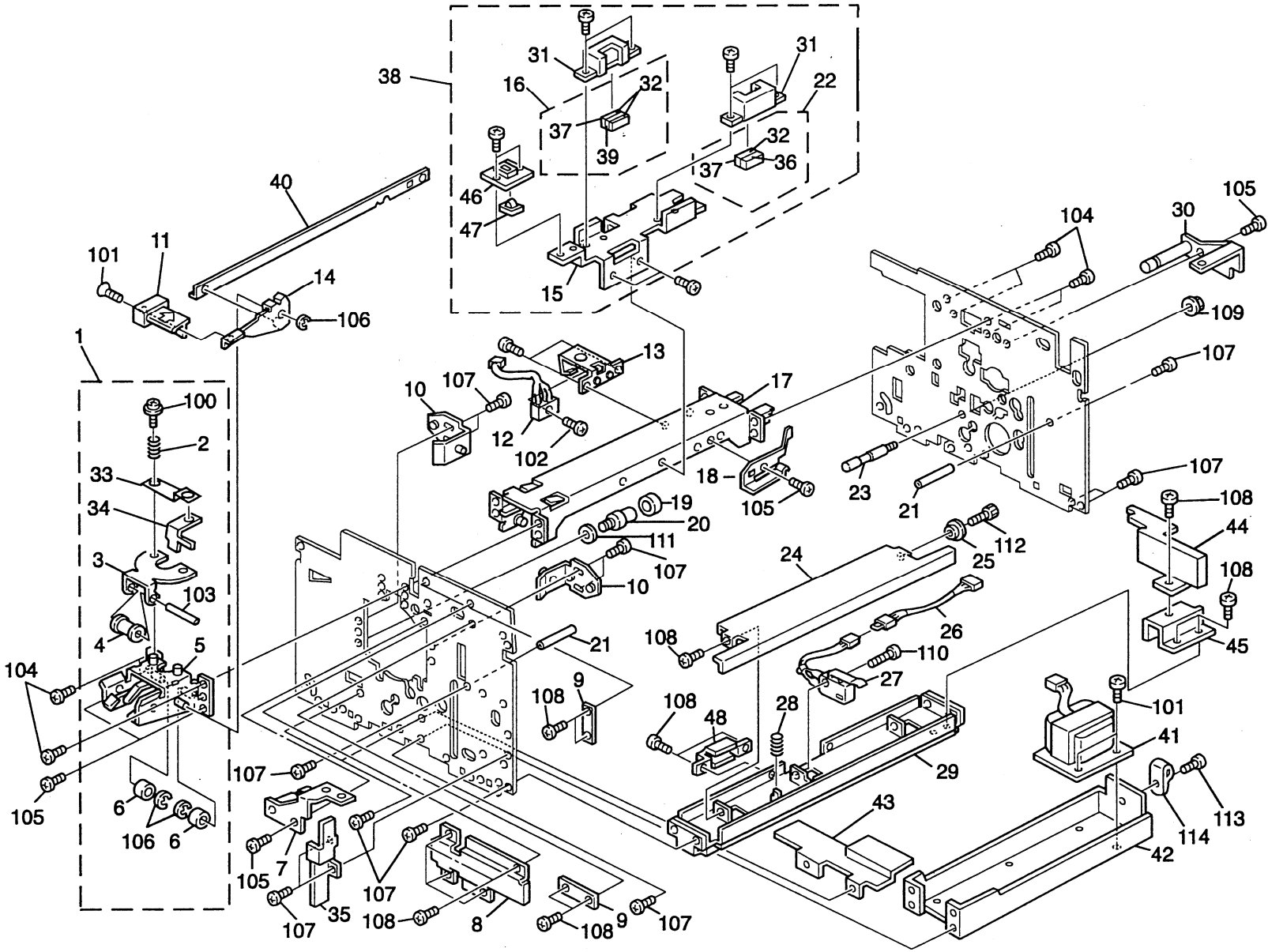


3. FRAME SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 3124	Spacer	1
2	C218 3123	Slide Rail	2
3	C222 2001	Left Side Plate	1
4	C219 2106	Left Grip - Paper Delivery	1
5	C209 2413	Right Cover Bracket	1
6	C209 2061	Left Grip - Paper Feed	1
7	C222 2062	Left Grip Cover	1
8	C218 2120	Board Bracket	1
9	C222 2098	Bottom Cover	1
10	C203 2091	Front Shaft	1
11	C222 2071	Bottom Stay	2
12	C209 2050	Front Stay	1
13	C219 2111	Shaft	1
14	C223 8223	AC Drive Harness - 230V	1
14	C223 8123	AC Drive Harness - 120V	1
15	C223 8111	DC Drive Harness - 120V	1
15	C223 8208	DC Drive Harness - 230V	1
16	C203 2096	Bottom Stay Nut	2
17	C222 2072	Bottom Stay	1
18	C218 3131	Slide Rail Left Bracket	1
19	C218 3127	Slide Rtail Right Bracket	1
20	C209 2006	Spacer	2
21	C222 2002	Right Side Plate	1
22	C219 2150	Rear Right Grip	1
23	C218 3135	Spacer Cushion	1
24	C218 3134	Scanner Base Cushion 2	2
25	C218 3133	Scanner Base Cushion 1	2
26	C218 3125	Scanner Open Actuater	2
27	C222 3136	Scanner Rail Stopper	1
28	C218 3138	Stopper Seal	1
29	C218 3130	Slide Rail Seal	1
30	C219 2152	Rear Cover Bracket	1
31	C223 2085	Paper Table Lower Cover	1
32	C222 2095	Bottom Cover - Delivery Table	1
33	C222 2089	Side Plate Bracket	2

Index No.	Part No.	Description	Q'ty Per Assembly
34	C222 2092	Seal	2
35	C219 2112	Harness Satay	1
100	0314 0060Z	Philips Pan Head Screw - M4x6	
101	0314 0080Z	Philips Screw - 4x8	
102	0434 0080Z	Tapping Screw - M4x8	
103	0595 0120E	Socket Screw - M5X12	
104	0315 0120Z	Philips Screw - 5x12	
105	0805 6009	Rubber Foot	
106	0951 5035Z	Philips Screw W/t Flat Washer-M3x35	
107	0801 1004	Screw - M4X4	
108	0324 0060Z	Philips Sunken Head Screw - M4x6	
109	0951 3006Z	Philips Screw With Flat Washer - M3x6	
110	1105 0209	Clamp	

4. FRAME SECTION 2 (C223)

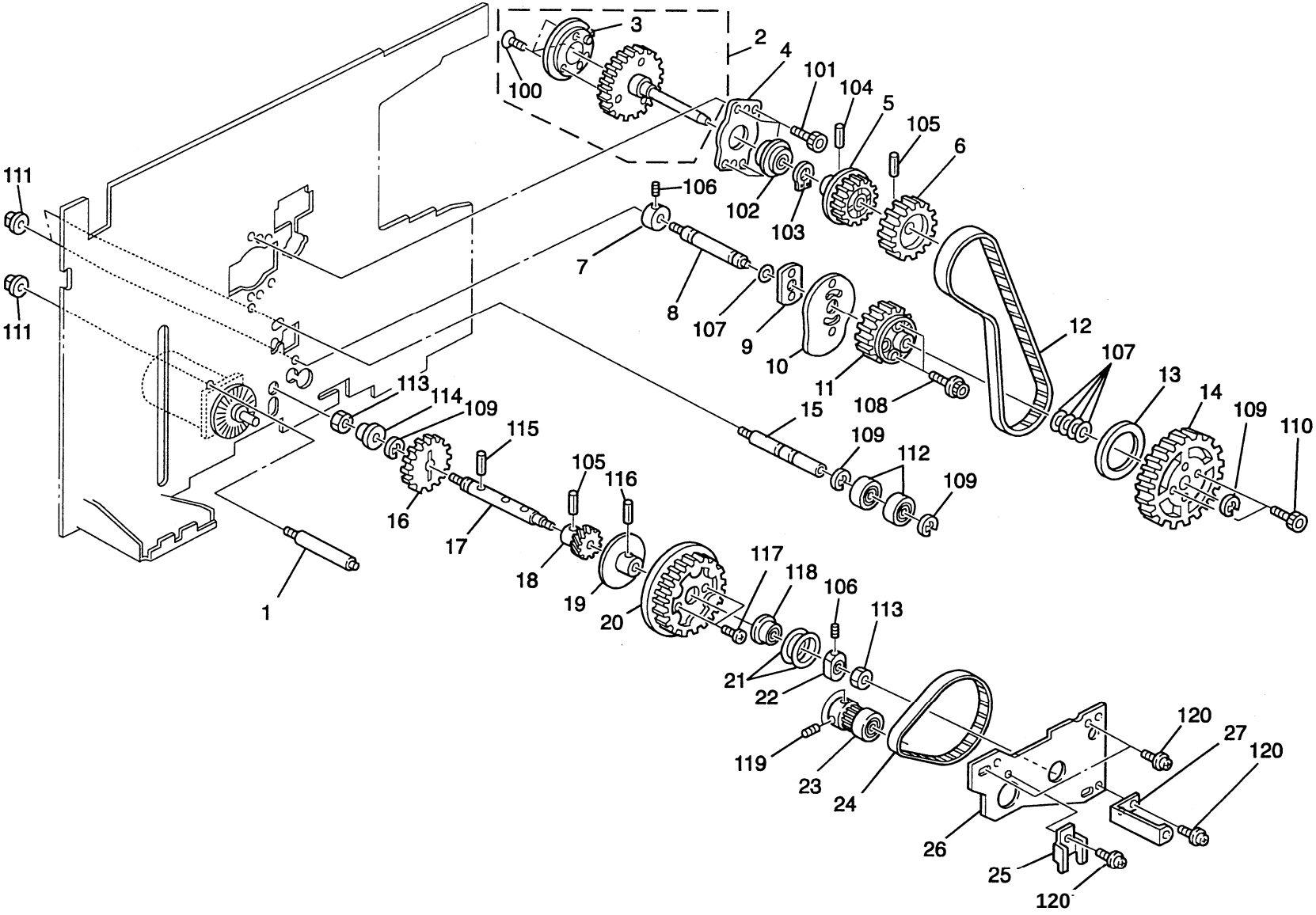


4. FRAME SECTION 2 (C223)

Index No.	pan No.	Description	Q'ty Per Assemby'
1	C219 4505	Drum Stopper Ass'y	1
2	C201 4533	Drum Stopper Spring	1
3	C201 4531	Drum Stopper Pawl	1
4	C201 4532	Drum Stopper Roller	1
5	C219 4506	Stopper Base	1
6	C2014604	Drum Rail Roller	2
7	C2232052	Left Fixing Bracket	1
8	C2182024	Flat Cable Cover	1
9	C2183039	Flat Cable Clamp	2
10	C2004520	Lock Pin-Drum	2
11	C2154514	Drun Lock Knob	1
12	C2098117	Drum Master Detection Sensor	1
13	C2094519	Drum Sensor Bracket	1
14	C2154511	Drum Lock Lever	1
15	C2232036	Scanner Stopper Bracket	1
16	C2232037	Cushionl	1
17	C2184502	Drum Rail Stay	1
18	C2184528	Plate Spring - Drum Rail	1
19	55014719	Rubber Ring-Stopper	1
20	C2003716	Cushion Shaft	1
21	C2094190	Stud	2
22	C2232038	Cushion2	1
23	C2092110	Drive Support Shaft	1
24	C2192428	Switch Plate-Paper Feed Table	1
25	54032048	Bushing-4mm	1
26	C2238295	Safety Switch Relay Harness	1
27	C2238294	Safety Switch	1
28	U063016	Pressure Spring	1
29	C2222429	Support Cover-Paper Feed Cover	1
30	C2092056	Right Fixing Plate	1
31	C2232039	Stopper Bracket	2
32	C2232040	StopperSeall	2
33	C2154533	Spring Plate	1
34	c2154532	Locking Arm	1
35	c2102186	Right Cover Bracket	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	C2232041	StopperSea12	1
37	C2232043	Stopper Seal	2
38	C2232029	Scanner Stopper Unit	1
39	C2232042	StopperSea13	1
40	C2154515	Drum Lock Link	1
41	C2188181	Transformer- l15V	1
41	C2168155	Transformer-235V/l 05V	1
42	C2162018	Transformer Bracket	1
43	C2182099	Transformer Cover	1
44	C2192441	Upper Harness Cover	1
45	C2192440	Lower HarnessCover	1
46	C2034511	Spring Plate Supporter	1
47	C2034512	Grounding Spring Plate	1
48	C2102091	Harness Cover	1
100	09513006Z	Philips Screw With FlatWasher-M3	
101	03230060Z	PhilipsSunkScrew -M3x6	
102	02520080Z	Philips Pan Head Screw -M2x8	
103	06220250E	Spring Pin M2x250	
104	04340100Z	Pan HeadSelf-tapping Screw- M4x10	
105	04340080Z	Tapping Screw- M4x8	
106	07200050Z	Retaining Ring - M5	
107	03140080Z	Philips Screw - 4x8	
108	03140060Z	Philips Pan Head Screw - M4x6	
109	07130050B	Hexagon Nut - M5	
110	03130120Z	Philips Screw - 3x12	
111	08073083	w asher	
112	05940080E	Bolt - M4x8	
113	09604005Z	Philips Flange Screw - M4x5	
114	11050009	Nylon Clip - 5N	

5. DRIVE SECTION 1 (C223)

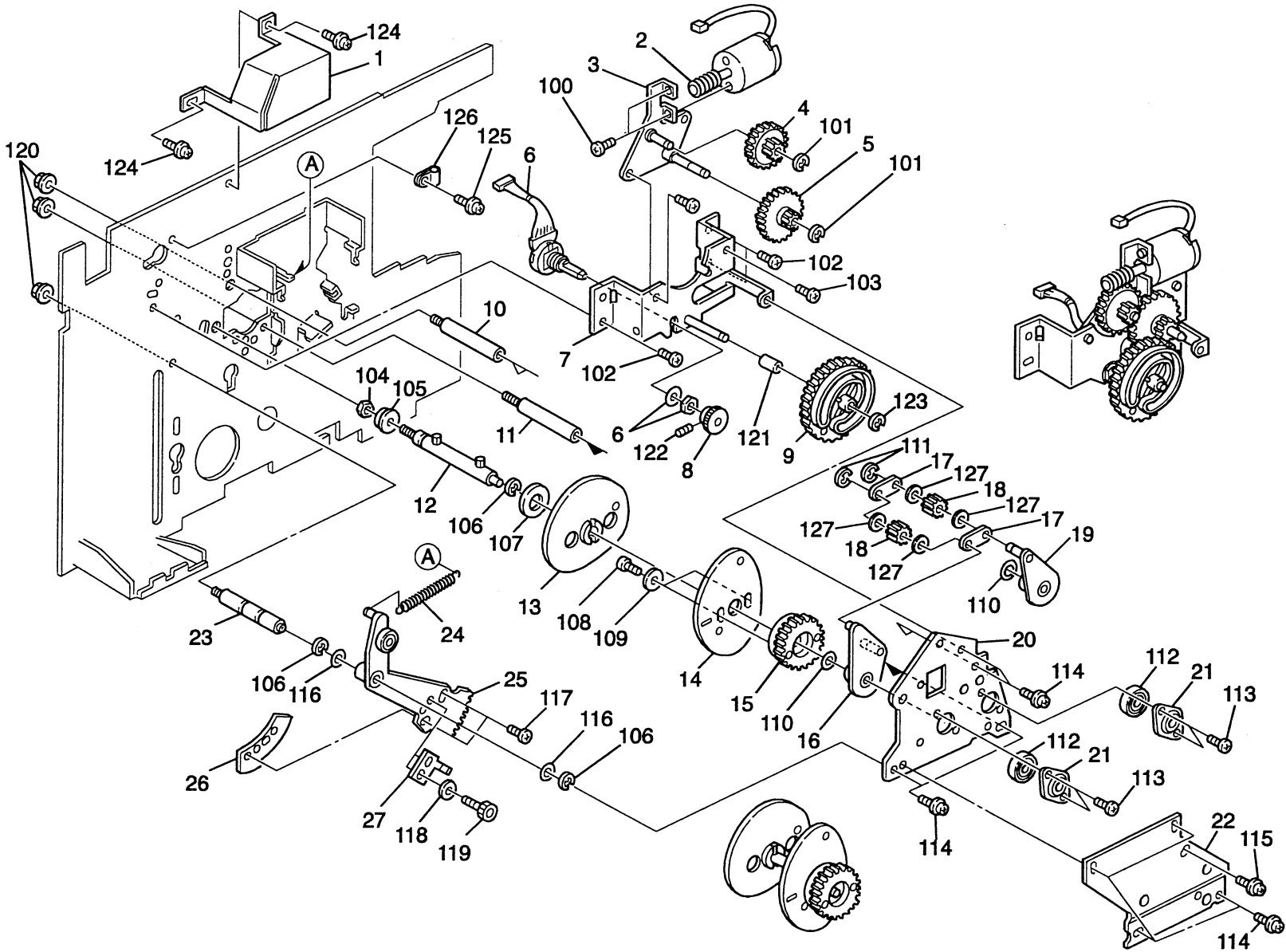


5. DRIVE SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C200 2232	Drive Shaft	1
2	C209 2218	Drum Drive Gear/pulley	1
3	C209 2220	Support Gear - 30Z	1
4	C200 2248	Fixing Plate	1
5	C203 2317	Pulley - 26Z	1
6	C223 2217	Gear - 50Z	1
7	C200 2221	Collar - Pressure Cam Shaft	1
8	C200 2225	Pressure Cam Shaft	1
9	C200 2224	Plate Nut - Print Pressure Cam	1
10	C223 5560	Pressure Roller Cam - DLT	1
11	C203 2312	Pulley	1
12	C203 2316	Timing Belt	1
13	C203 2327	Pulley Flange	1
14	C203 2326	Gear - 90Z	1
15	C219 2315	Tension Shaft	1
16	C209 2214	Gear - 40Z	1
17	C209 2216	Driver Shaft	1
18	C203 2215	Gear - 18T	1
19	C203 2311	Gear Flange	1
20	C207 2209	Pulley - 60Z	1
21	C200 2267	Spacer	2
22	C219 2217	Collar	1
23	C209 2207	Pulley - 12Z	1
24	C207 2210	Timing Belt - 100S4.5M297	1
25	C207 2211	Bearing Stopper	1
26	C223 2309	Support Plate	1
27	C209 2308	Support Bracket - Rear Cover	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0323 0060Z	Philips Sunk Screw - M3x6	
101	0594 0080E	Bolt - M4x8	
102	0805 3134	Ball Bearing - 10x26x8mm	
103	0725 0100Z	Retaining Ring - M10	
104	0804 4048	Spring Pin - 4x20	
105	0804 4046	Spring Pin - 4x16	
106	0574 0040E	Hexagon Headless Set Screw - M4x4	
107	0807 7013	Spacer - 10.2 X 14 X 0.2 mm	
108	0804 6092	Hexagonal Set Screw	
109	0720 0080Z	Retaining Ring - M8	
110	0595 0120E	Socket Screw - M5X12	
111	0713 0050B	Hexagon Nut - M5	
112	0740 3010	Ball Bearing - 10x26x8mm	
113	0712 0060Z	Hexagon Nut - M6	
114	0741 3807S	Ball Bearing - 7x14x5	
115	0623 0200E	Spring Pin - 3x20mm	
116	0623 0140E	Spring Pin - 3x14mm	
117	0315 0060Z	Philips Screw - 5x6	
118	0741 3908S	Ball Bearing - 8x19x6	
119	0574 0050E	Hexagon Headless Set Screw - M4x5	
120	0960 4008Z	Flange Head Screw - 4 X 8	

6. DRIVE SECTION 2 (C223)

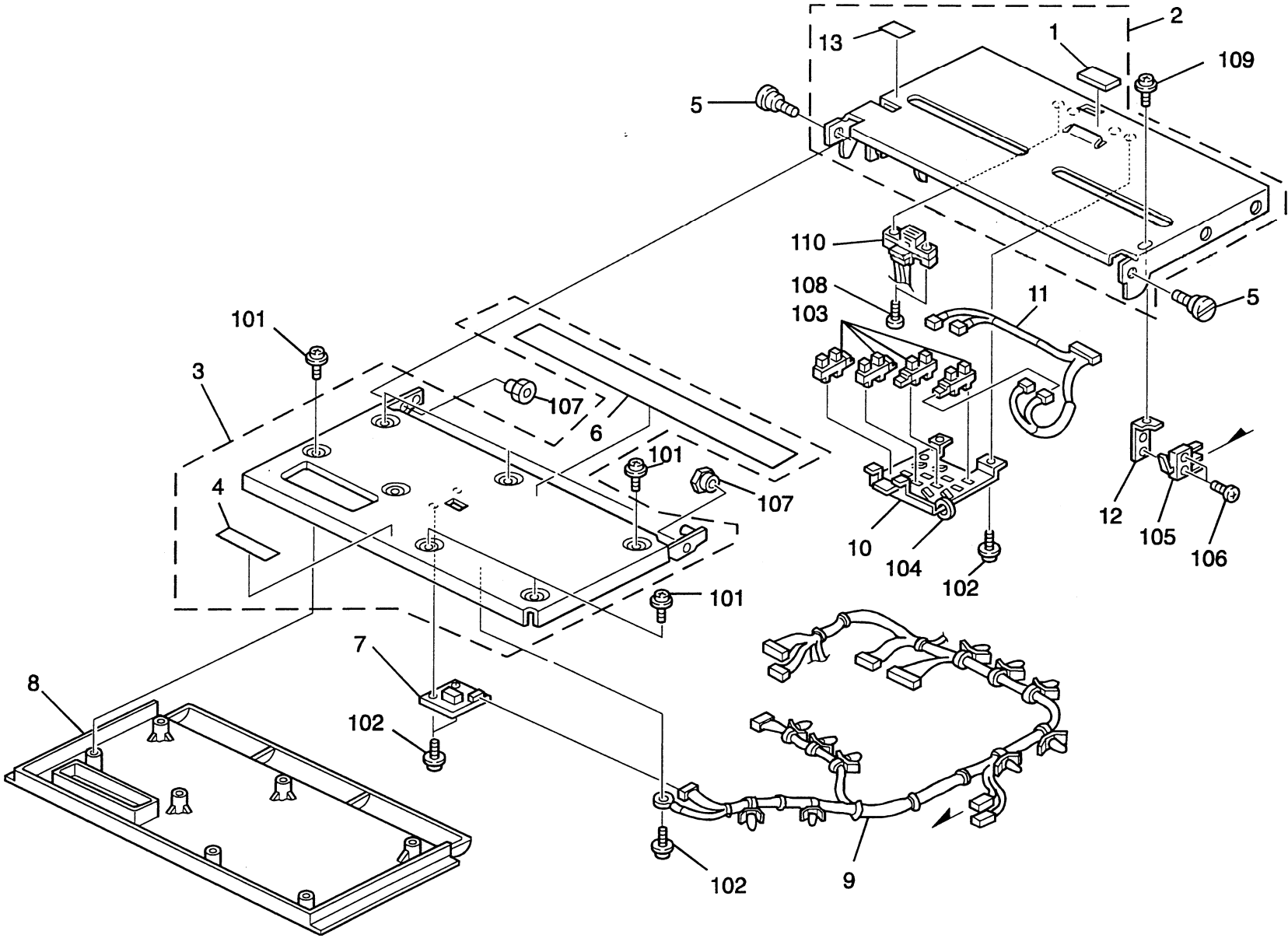


6. DRIVE SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 2047	Lift Moter Cover	1
2	C219 8250	Lift Motor - DC 1.69W 0.2A	1
3	C209 2325	Motor Bracket	1
4	5205 2681	Coupled Gear - 17T/50T	1
5	5205 2680	Coupled Gear - 16T/53T	1
6	C209 8280	Image Position Sensor	1
7	C209 2321	Bracket - Image Shifting	1
8	C201 2221	Gear - 40T	1
9	C201 2222	Coupled Gear - 20T & 60T	1
10	C201 2211	Stud	1
11	C219 5120	Feed Cam Shaft	1
12	C203 5170	Feed Cam Shaft	1
13	C213 5110	Paper Feed Cam	1
14	C223 5120	Feed Cam - DLT	1
15	C223 2229	Feed Cam Gear	1
16	C200 2302	Image Shifting Arm - Large	1
17	C200 2311	Image Shifting Link	2
18	C219 2226	Gear - 22Z	2
19	C200 2308	Image Shifting Arm - Small	1
20	C209 2304	Support Side Plate	1
21	C200 2266	Bearing Holder	2
22	C203 2318	Reinforcement Plate	1
23	C219 2075	Feed Gear Stopper Shaft	1
24	C200 5222	Sector Spring	1
25	C203 5184	Sector Gear	1
26	C200 5223	Lift Cam	1
27	C219 5106	Sector Gear Stopper	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0313 0040B	Philips Pan Head Screw - M3x4	
101	0720 0040Z	Retaining Ring - M4	
102	0434 0080Z	Tapping Screw - M4x8	
103	0314 0080Z	Philips Screw - 4x8	
104	0712 0060Z	Hexagon Nut - M6	
105	0741 3807S	Ball Bearing - 7x14x5	
106	0720 0080Z	Retaining Ring - M8	
107	0807 7055	Holder - Main Shaft	
108	0585 0100Z	Bolt - M5x10	
109	0701 0050Z	Flat Washer - M5	
110	0807 7013	Spacer - 10.2 X 14 X 0.2 mm	
111	0720 0080Z	Retaining Ring - M8	
112	0805 3104	Ball Bearing - 8x22x7mm	
113	0801 1135	Philips Pan Head Screw - M3x3	
114	0960 4008Z	Flange Head Screw - 4 X 8	
115	0960 5008Z	Philips Flange Screw - M5x8	
116	0807 7018	Washer - M10	
117	0315 0080Z	Philips Screw - 5x8	
118	0701 0040Z	Flat Washer - M4	
119	0594 0060E	Socket Screw - 4X6	
120	0713 0050B	Hexagon Nut - M5	
121	0707 6120B	Bushing - 6x12mm	
122	0573 0050E	Hexagon Headless Set Screw - M3x5	
123	0720 0050Z	Retaining Ring - M5	
124	0314 0060Z	Philips Pan Head Screw - M4x6	
125	0951 4006Z	Philips Screw With Flat Washer - M4	
126	1105 0005	Nylon Clip - 3n	
127	0807 7013	Spacer - 10.2 X 14 X 0.2 mm	

7. PAPER TABLE SECTION 1 (C223)

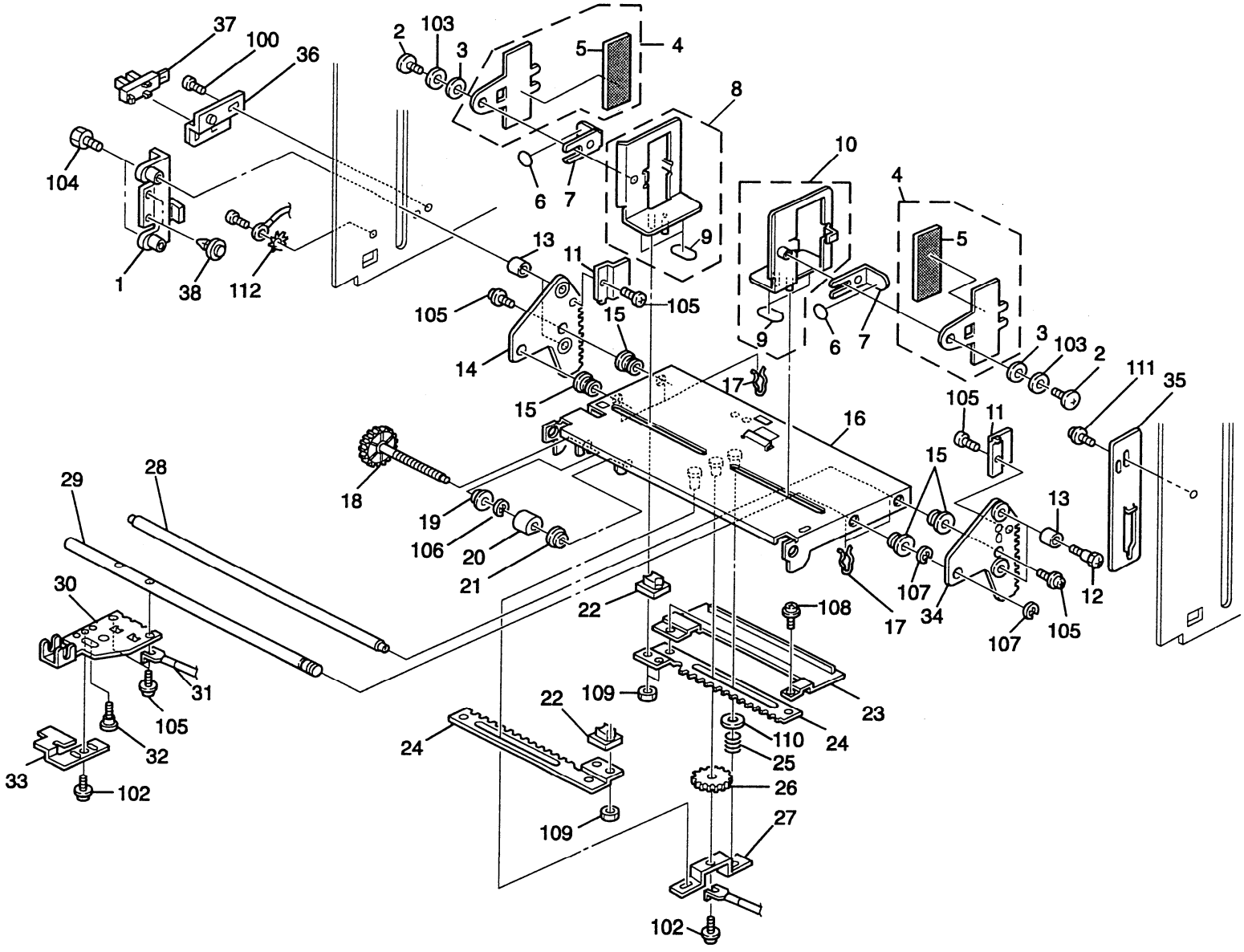


7. PAPER TABLE SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	5507 6828	Rubber Plate - Feed Table	1
2	C209 4640	Paper Table Ass'y	1
3	C219 5066	Paper Feed Table Ass'y - LT	1
3	C219 5067	Paper Feed Table Ass'y - A4	1
4	C200 5025	Paper Feed Plate Shield	1
5	C219 5073	Stepped Screw	2
6	C210 2805	Decal - Paper Size (LT)	1
6	C210 2806	Decal - Paper Size (A4)	1
7	C219 8021	Paper Detection Board	1
8	C218 2423	Paper Feed Table Cover	1
9	C219 8113	Harness - Paper Detection Board	1
10	C209 5055	Bracket - Paper Size	1
11	C209 8197	Paper Size Sensor Harness	1
12	C209 5047	Switch Bracket - Paper Table	1
13	C223 2453	Decal - Paper Level	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0965 3010W	Tapping Screw With Flat Washer-M3x1	
102	0951 3005Z	Philips Pan Head Screw - M3 X 5	
103	1403 0690	Sensor - TLP1215	
104	1105 0042	Wire Band	
105	1204 2239	Micro Switch	
106	0800 0084	Philips Pan Head Screw - M2.3x12	
107	0713 0050B	Hexagon Nut - M5	
108	0313 0100Z	Philips Pan Head Screw - M3x10	
109	0951 3004Z	Philips Screw With Flat Washer-M3x4	
110	1403 0456	Photosensor - EE-SB5-C3	

8. PAPER TABLE SECTION 2 (C223)

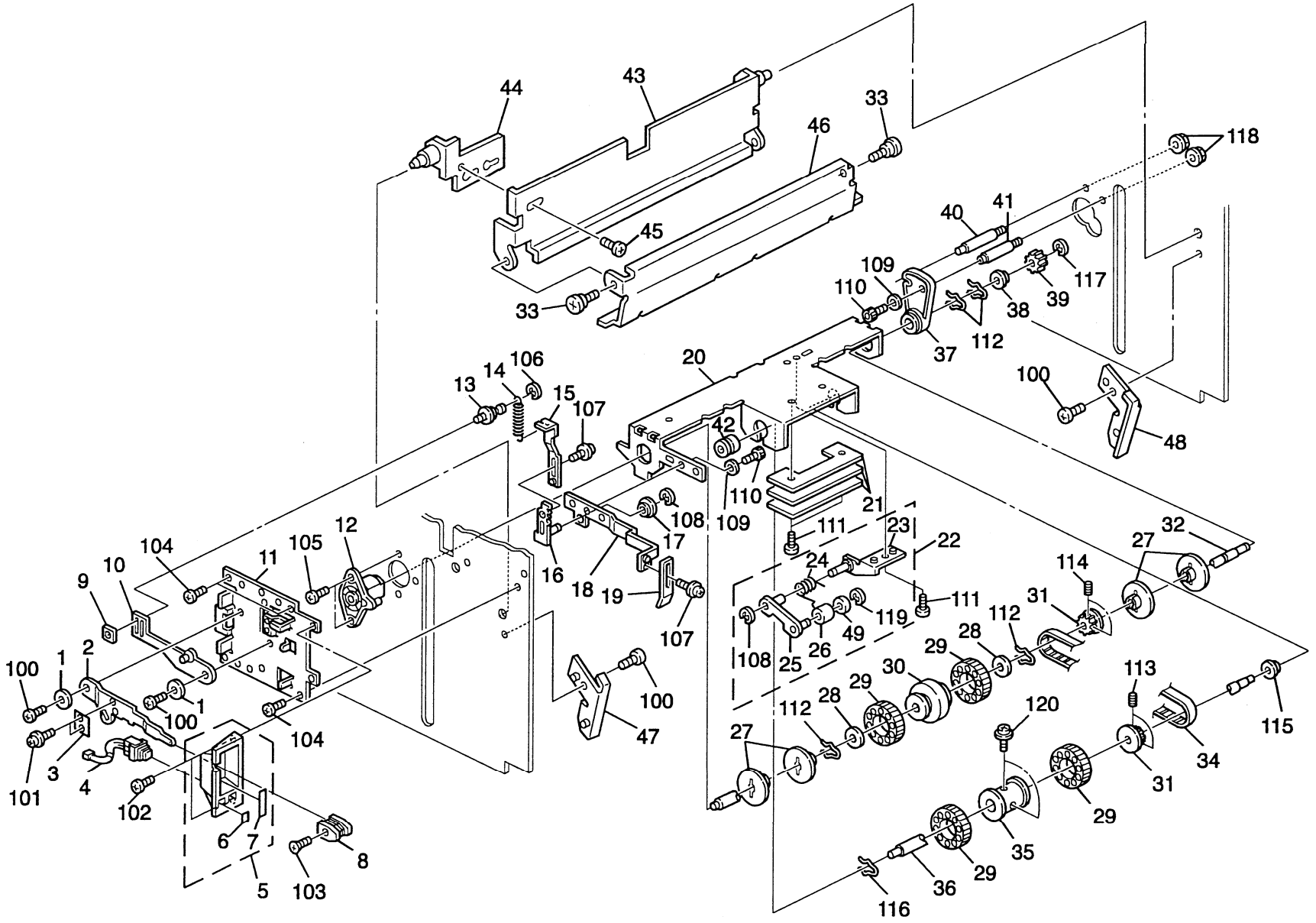


8. PAPER TABLE SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C223 5073	Paper Table Fixing Bracket	1
2	5506 1536	Screw - M4X6	2
3	5070 0923	Spring Washer - Rotating Table	2
4	C209 5090	Rubber Plate - Paper Feed Guide	2
5	C200 5287	Rubber Plat - Paper Feed	2
6	C201 5015	Seal - M10	2
7	C209 5092	Rubber Plate Lever	2
8	C223 5082	Left Side Plate	1
9	5506 6314	Mylar - Master Feed Table	2
10	C223 5085	Right Side Plate	1
11	C203 5131	Gear Cover	2
12	C203 5142	Rack Shaft	2
13	5606 2310	Roller	4
14	C223 5128	Left Rack - Paper Feed	1
15	C203 5121	Bushing - 8x12x9mm	4
16	C219 5076	Paper Table	1
17	5600 1107	Snap Retainer - 12	2
18	C218 5054	Table Position Knob	1
19	C203 5113	Bushing - 6x9x3mm	1
20	C203 5116	Washer - 6x13x12mm	1
21	C203 5114	Bushing - 3x6x3mm	1
22	C223 5336	Paper Feed Slider	2
23	C209 5058	Psper Size Plate	1
24	C223 5050	Paper Guide Rack	2
25	5505 7197	Spring - Hinge - Inking	1
26	5309 1023	Pinion Paper Feed Table	1
27	C219 5079	Supporter	1
28	C200 5042	Rear Shaft - Paper Feed	1
29	C223 5123	Front Shaft - Paper Feed	1
30	C223 5055	Paper Table Arm	1
31	C209 8197	Paper Size Sensor Harness	1
32	C223 5124	Stepped Screw - M8.2	1
33	C222 5121	Position Indicator	1
34	C203 5126	Right Rack - Paper Feed	1
35	C209 5235	Paper Table Holder	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	C219 5081	Sensor Bracket	1
37	AW02 0021	Photointerruptor - 175487-3	1
38	C222 3175	Scanner Slider	2
100	0314 0120Z	Philips Screw - 4x12	
102	0314 0080Z	Philips Screw - 4x8	
103	0701 0080Z	Flat Washer - M8	
104	0585 0161B	Hexagon Bolt - M5x16	
105	0951 4008Z	Philips Screw With Flat Washer M4x8	
106	0720 0040Z	Retaining Ring - M4	
107	0720 0060Z	Retaining Ring - M6	
108	0951 3006Z	Philips Screw With Flat Washer - M3	
109	0710 0040Z	Hex Nut 4	
110	0700 0060Z	Flat Washer - M6	
111	0951 3008Z	Philips Screw With Flat Washer - M3	
112	0705 0040B	Toothed Washer	

9. PAPER FEED ROLLER AND SEPARATION ROLLER(C223)



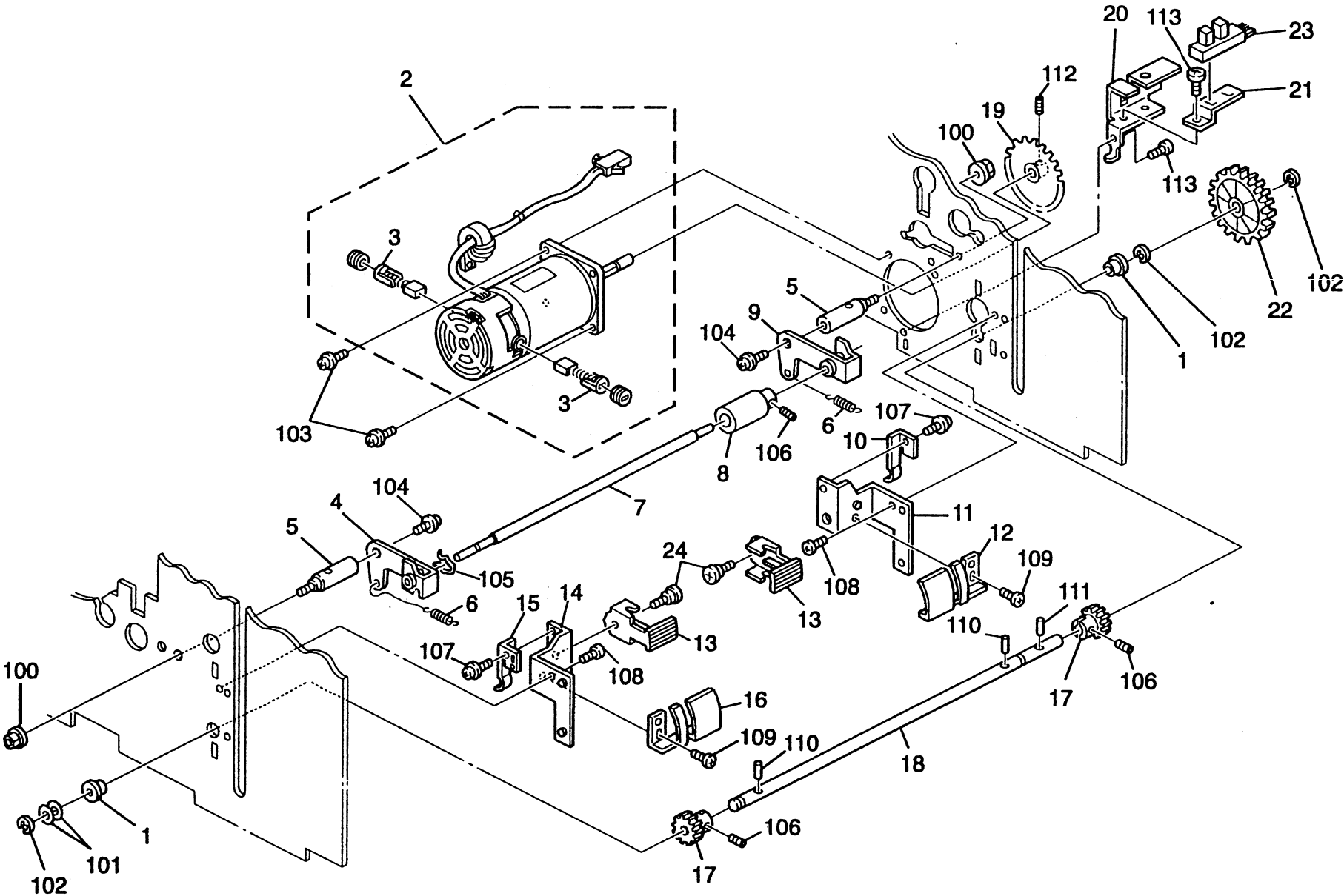
9. PAPER FEED ROLLER AND SEPARATION ROLLER(C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 5220	Spacer - 4x20x6	2
2	C203 5007	Paper Feed Lever	1
3	5501 8180	Flat Spring - Feed Roller Pressure	1
4	C209 8288	Table Down Switch	1
5	C218 2833	Lower Cover - Paper Feed (A4)	1
5	C218 2804	Lever Cover - Paper Feed - LT	1
6	C218 2841	Decal - Paper Table Down (A4)	1
6	C218 2819	Decal - Paper Table Down (LT)	1
7	C218 2818	Decal - Paper Feed Pressure - LT	1
8	C201 2425	Adjusting Lever	1
9	5506 4235	Plate Nut - Paper Pressure	1
10	C203 5013	Lever Supporter	1
11	C209 2027	Lever Bracket - Paper Feed	1
12	C203 5045	Bushing - 18x24x28mm	1
13	C209 5080	Stepped Screw	1
14	C203 5020	Spring - Feed Roller Pressure	1
15	C209 5081	Spring Link	1
16	C203 5027	Adjusting Plate	1
17	C203 5113	Bushing - 6x9x3mm	1
18	C209 5035	Arm - Feed Roller Holder	1
19	C203 5055	Actuator - Paper Feed Table	1
20	C209 5225	Feed Roller Holder	1
21	C201 5073	Arm Balancer - Feed Roller	3
22	C203 5205	Belt Tensioner Ass'y	1
23	C203 5208	Tension Bracket	1
24	C203 5215	Tension Spring	1
25	C203 5201	Tension Arm	1
26	C203 5200	Tension Roller	1
27	5606 2066	Paper Feed Guide Disc	4
28	5600 1086	Spacer - 10.2 X 20	2
29	5506 4169	Rubber Roller - Paper Feed	4
30	C207 5023	Separator Roller Ass'y	1
31	5507 6032	Timing Belt Pulley - 30T	2
32	C207 5020	Upper Roller Shaft	1
33	5206 2684	Shoulder Screw - M3	2
34	5507 6035	Timing Belt - 162XL	1
35	C219 5033	Paper Feed Roller	1
36	C219 5026	Pick-up Roller Shaft	1
37	C203 5046	Bushing - 14x20x9mm	1
38	5053 0419	Bushing - 10mm	1
39	C203 5220	Gear - 18T	1
40	C203 5050	Rear Bushing Stud	1
41	C203 5049	Front Bushing Stud	1
42	5600 1081	Right Bushing - Paper Feed Roller	1
43	C223 5350	Upper Paper Guide	1
44	C223 5355	Paper Guide Slider	1
45	C218 3051	Philips Screw - M3	1
46	C223 5360	Lower Paper Guide	1
47	C223 5365	Left Guide Plate	1
48	C223 5366	Right Guide Plate	1
49	C203 5225	Spacer - Tension - Paper Feed	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0314 0100Z	Philips Screw - 4x10	
101	0951 3006Z	Philips Screw With Flat Washer - M3	
102	0801 1004	Screw - M4X4	
103	0323 0100Z	Philips Sunken Head Screw - M3x10	
104	0434 0080Z	Tapping Screw - M4x8	
105	0314 0080Z	Philips Screw - 4x8	
106	0720 0040Z	Retaining Ring - M4	
107	0951 3005Z	Philips Pan Head Screw - M3 X 5	
108	0720 0040Z	Retaining Ring - M4	
109	0701 0040Z	Flat Washer - M4	
110	0594 0080E	Bolt - M4x8	
111	0314 0060Z	Philips Pan Head Screw - M4x6	
112	0804 4055	Pin	
113	0574 0040E	Hexagon Headless Set Screw - M4x4	
115	0805 3263	Bearing - 6 X 10 X 6mm	
116	5600 1107	Snap Retainer - 12	
117	0720 0050Z	Retaining Ring - M5	
118	0713 0040B	Hexagon Nut - M4	
119	0720 0060Z	Retaining Ring - M6	
120	0951 4010Z	Philips Screw With Flat Washer M4 X	

Index No.	Part No.	Description	Q'ty Per Assembly

10. PAPER SEPARATION ROLLER (C223)

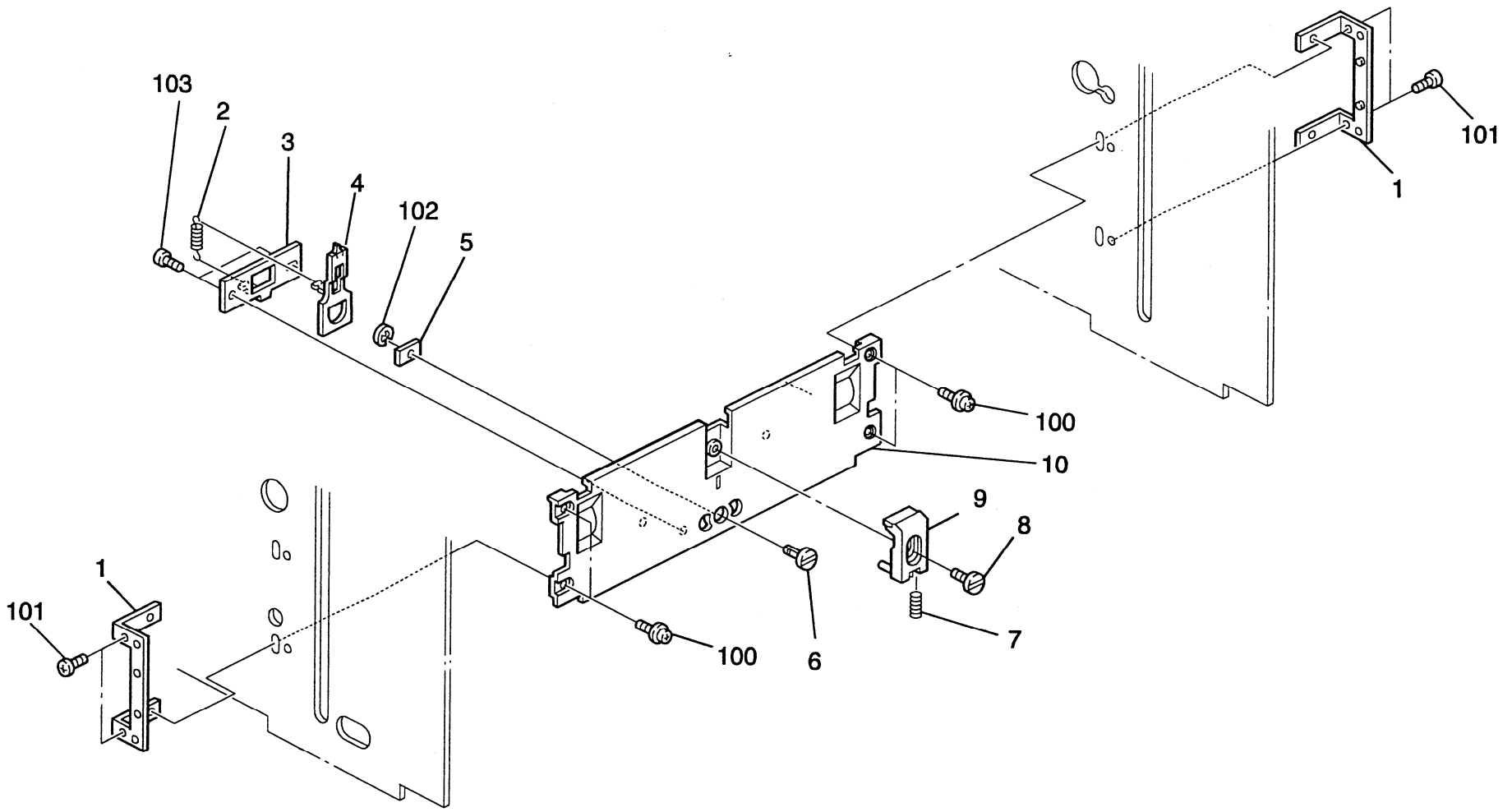


10. PAPER SEPARATION ROLLER (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C203 5135	Bushing - 10x14x5.9	2
2	C218 8200	Main Motor - DC90V 108W	1
3	C209 8202	Commutation Brush	2
4	C203 5062	Left Arm - Separation	1
5	C201 5090	Separation Roller Pressure Stud	2
6	C223 5030	Lower Spring	2
7	C222 5020	Separation Roller Shaft	1
8	C223 5015	Lower Reverse Roller	1
9	C203 5066	Right Arm - Separation	1
10	C209 5208	Spling Plate - Right Lever	1
11	C209 5206	Right Lever Bracket	1
12	C209 5211	Right Lever Cover	1
13	C209 5209	Separation Pressure Lever	2
14	C209 5205	Left Lever Bracket	1
15	C209 5207	Spring Plate - Left Lever	1
16	C209 5210	Left Lever Cover	1
17	C201 5051	Pinion - 24T	1
18	C223 5133	Paper Lift Shaft	1
19	C203 2309	Pulse Disk	1
20	C219 2205	Bracket - Drum Rotation Sensor	1
21	C219 2306	Drum Sensor Bracket	1
22	C223 5096	Lift Gear	1
23	AW02 0021	Photointerruptor - 175487-3	1
24	5403 2075	Stepped Screw	2

Index No.	Part No.	Description	Q'ty Per Assembly
100	0713 0040B	Hexagon Nut - M4	
101	0807 7013	Spacer - 10.2 X 14 X 0.2 mm	
102	0720 0080Z	Retaining Ring - M8	
103	0960 4008Z	Flange Head Screw - 4 X 8	
104	0951 4008Z	Philips Screw With Flat Washer M4x8	
105	0804 4061	Spring Pin - M6	
106	0574 0040E	Hexagon Headless Set Screw - M4x4	
107	0951 3005Z	Philips Pan Head Screw - M3 X 5	
108	0801 1004	Screw - M4X4	
109	0313 0050Z	Philips Screw - 3x5	
110	0624 0160E	Spring Pin - 4x16mm	
111	0623 0200E	Spring Pin - 3x20mm	
112	0574 0050E	Hexagon Headless Set Screw - M4x5	
113	0314 0080Z	Philips Screw - 4x8	

11. PAPER DELIVERY SECTION 1 (C223)

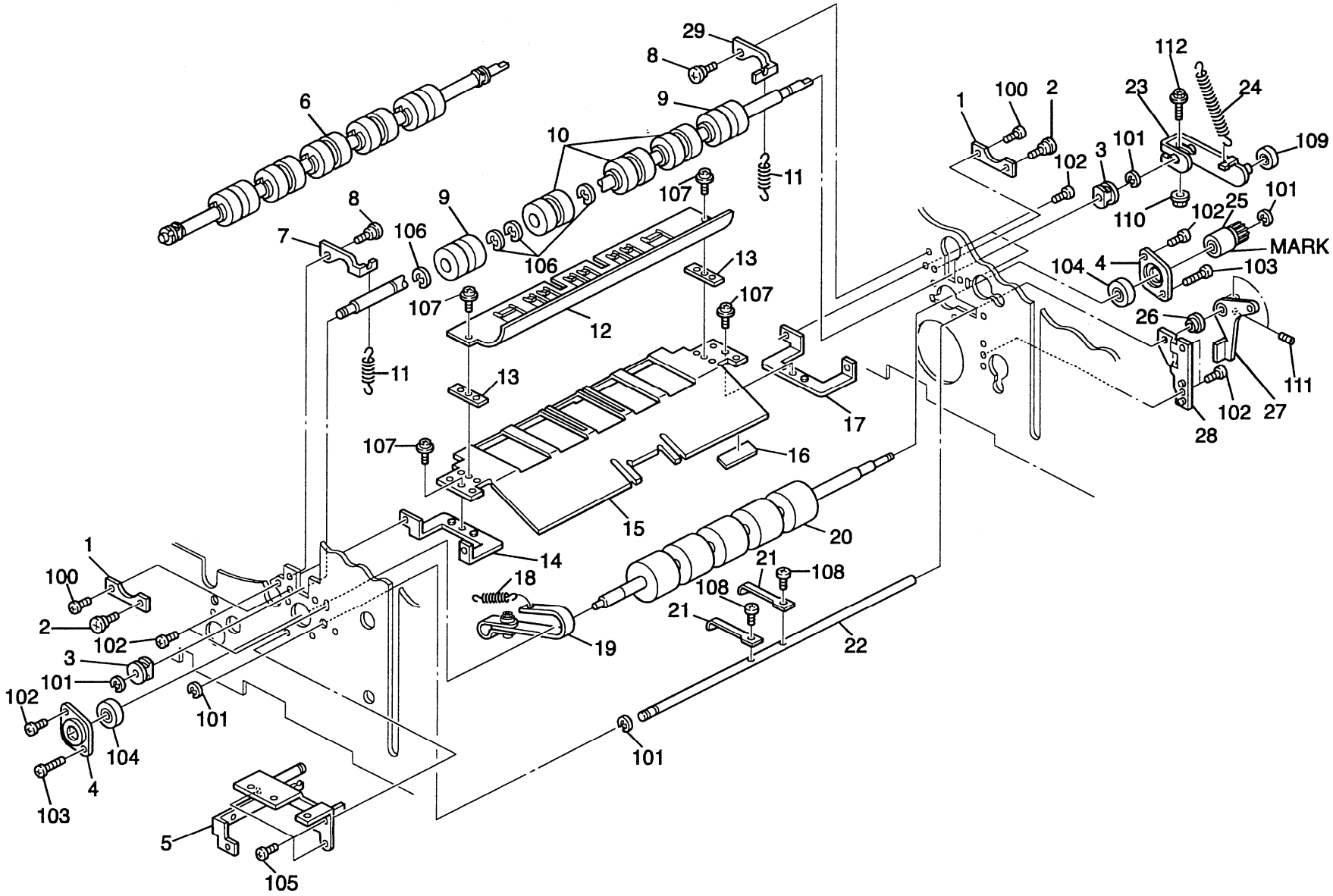


11. PAPER DELIVERY SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C201 5075	Guide Plate Bracket	2
2	C207 5013	Pressure Spring - Paper Feed	1
3	C207 5009	Pressure Plate Holder	1
4	C207 5008	Pressure Plate	1
5	C207 5011	Adjusting Plate	1
6	C207 5010	Adjusting Screw	1
7	C207 5012	Pressure Spring	1
8	5507 6060	Guide Screw - Front Plate	1
9	C209 5018	Separation Plate	1
10	C218 5016	Front Side Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0952 4008W	Philips Screw - M4x8	
101	0434 0080Z	Tapping Screw - M4x8	
102	0720 0040Z	Retaining Ring - M4	
103	0313 0050W	Philips Pan Head Screw - M3x5	

12. PAPER DELIVERY SECTION 2 (C223)

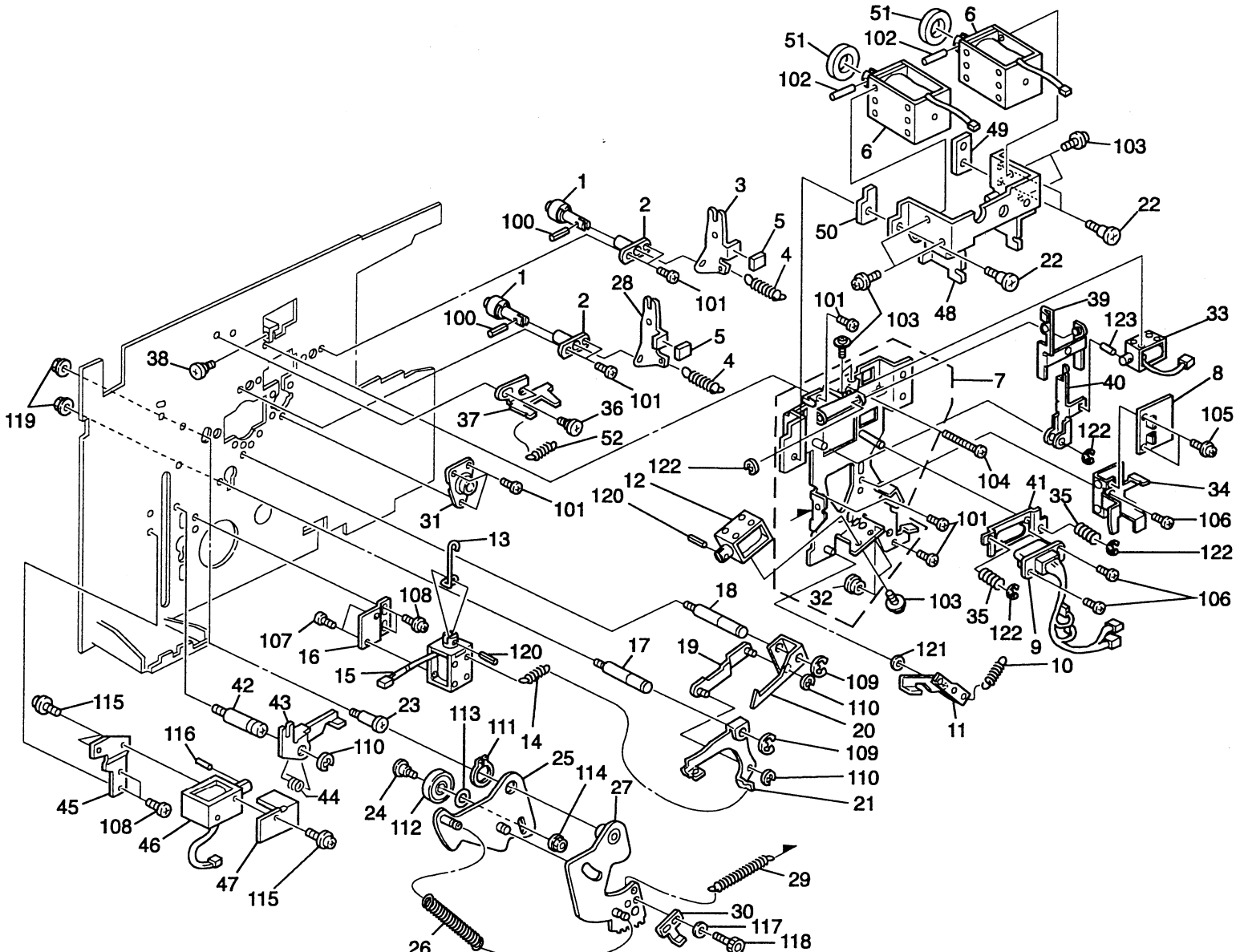


12. PAPER DELIVERY SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C200 5153	Bushing Supporter	2
2	C201 5125	Shoulder Screw - M4	2
3	C200 5150	Bushing - 7x18x9mm	2
4	C201 5134	Bearing Holder	2
5	C209 2034	Sensor Bracket	1
6	C207 5138	Upper Feed Roller Ass'y	1
7	C200 5154	Left Spring Arm	1
8	C201 5125	Shoulder Screw - M4	2
9	C200 5340	Upper Feed Roller	2
10	C207 5148	Upper Feed Roller	3
11	5505 6528	Spring - Press Roller	2
12	C207 5123	Upper Guide Plate	1
13	C207 5125	Guide Plate Spacer	2
14	C200 5137	Left Bracket - Guide Plate	1
15	C223 5215	Lower Guide Plate	1
16	C222 5216	Rubber Plate - Guide Plate	1
17	C200 5138	Right Bracket - Guide Plate	1
18	5501 8328	Spring - Feed Roller Brake	1
19	C203 5198	Feed Roller Brake Ass'y	1
20	C209 5203	Lower 2nd Feed Roller	1
21	C200 5504	Paper Detecting Pin	2
22	C200 5503	Paper Detecting Shaft	1
23	C201 5142	Lift Arm - Feed Roller	1
24	C201 5145	Lift Arm Spring	1
25	C209 5200	Gear - 14Z	1
26	5600 1080	Bush - Paper Feed Roller - Left	1
27	C209 5515	Paper Detecting Arm	1
28	C201 5505	Height Sensor Bracket	1
29	C200 5155	Right Spring Arm	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0801 1004	Screw - M4X4	
101	0720 0050Z	Retaining Ring - M5	
102	0314 0080Z	Philips Screw - 4x8	
103	0314 0200Z	Philips Screw - 4x20	
104	0740 3010	Ball Bearing - 10x26x8mm	
105	0434 0080Z	Tapping Screw - M4x8	
106	0805 0084	Retaining Ring	
107	0951 4006Z	Philips Screw With Flat Washer - M4	
108	0313 0050Z	Philips Screw - 3x5	
109	0740 3808	Ball Bearing - 8x16x5mm	
110	0713 0040B	Hexagon Nut - M4	
111	0573 0050E	Hexagon Headless Set Screw - M3x5	
112	0804 6090	Hexagon Bolt - M4	

13. PAPER DELIVERY SECTION 3 (C223)



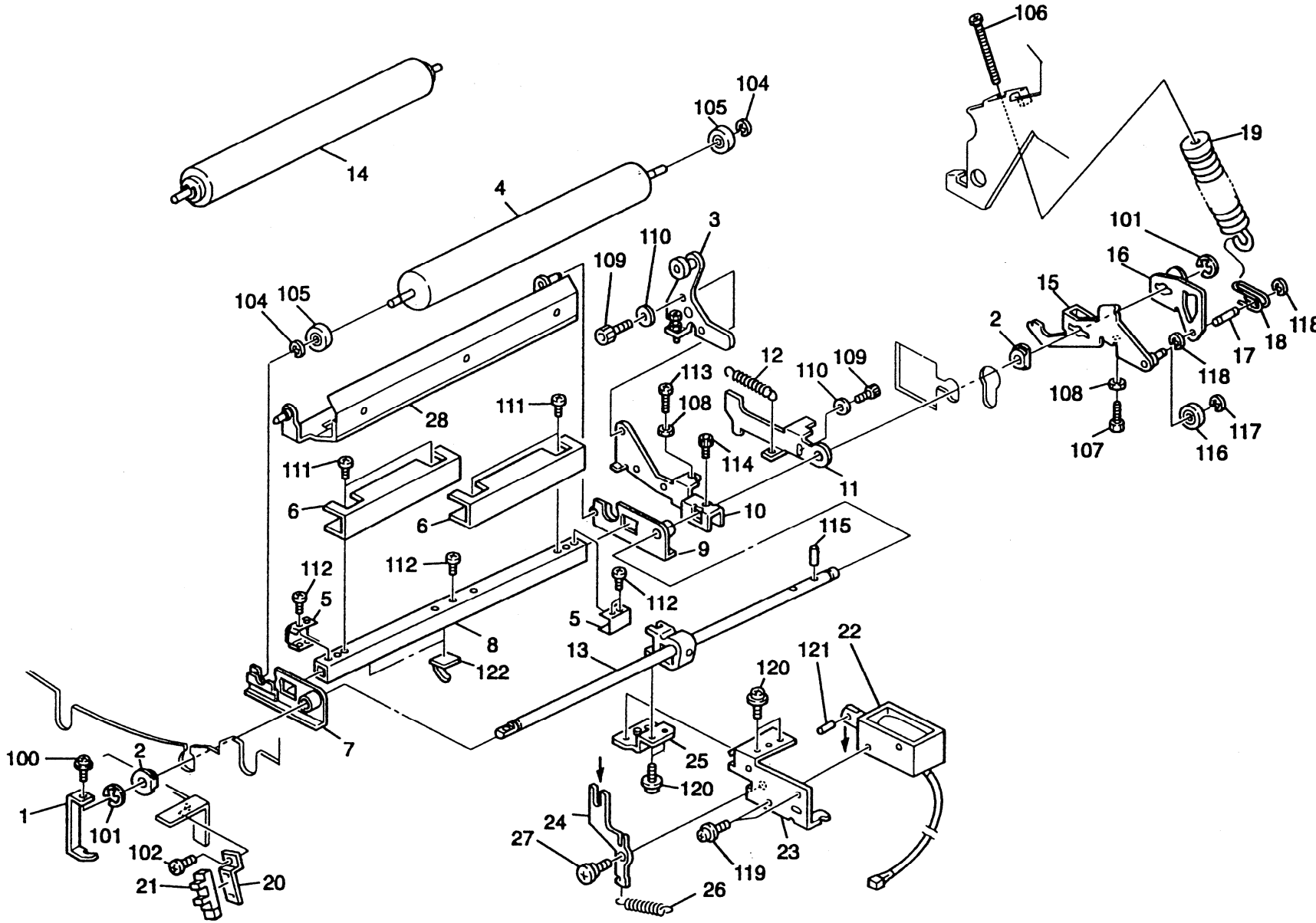
13. PAPER DELIVERY SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C203 4515	Drum Clamper Roller	2
2	C200 4551	Slide Guide	2
3	C223 4553	Master Release Lever	1
4	C200 4561	Clamper Spring	2
5	C223 4398	Lever Cushion	2
6	C223 8224	DC Solenoid Ass'y	2
7	C223 2082	Solenoid Bracket	1
8	C215 8116	Ink Detecting Board	1
9	C223 8119	Drum Harness	1
10	5501 7559	Spring - Master Feed	1
11	C200 5565	Print Pressure Stopper	1
12	C209 8262	Release Solenoid	1
13	C200 5226	Link - Paper Feed Solenoid	1
14	C200 5235	Paper Feed Solenoid Spring	1
15	C209 8262	Release Solenoid	1
16	C200 5225	Bracket - Paper Feed Solenoid	1
17	C219 2073	Stopper Stud - Paper Feed	1
18	C219 2075	Feed Gear Stopper Shaft	1
19	C201 5101	Link	1
20	C219 5109	Feed Sector Stopper	1
21	C219 5108	Sector Stopper - Feed Roller	1
22	5403 6246	Stepped Screw - Cleaning	3
23	C219 5127	Sector Gear Shaft	1
24	C203 5194	Shoulder Screw - M4	1
25	C219 5122	Paper Feed Sector Cam	1
26	C200 5205	Paper Feed Spring	1
27	C219 5101	Sector Gear	1
28	C223 4552	Master Exit Lever	1
29	C200 5222	Sector Spring	1
30	C219 5105	Sector Gear Stopper	1
31	C209 4516	Slide Guide - Drive Shaft	1
32	C203 2083	Exit Pawl Bushing	1
33	C209 8234	Drum Lock Solenoid	1
34	C218 4536	Ink Detecting Board Bracket	1
35	C218 4539	Connector Spring	2
36	C201 5125	Shoulder Screw - M4	2
37	C215 4538	Slid Lock Arm	1
38	5403 2075	Stepped Screw	1
39	C215 4517	Connector Lock Arm	1
40	C215 4537	Connector Lock Lever	1
41	C218 4535	Drum Connector Bracket	1
42	C222 5519	Release Lever Shaft	1
43	C222 5518	Paper Release Lever	1
44	C222 5512	Tension Spring	1
45	C222 5520	Solenoid Bracket	1
46	C222 8234	Paper Release Solenoid	1
47	C222 5525	Solenoid Cover	1
48	C223 4392	Solenoid Bracket	1
49	C223 4395	Right Cushion	1
50	C223 4396	Left Cushion	1
51	C223 4555	Cushion	2
52	C201 5080	Separation Roller Pressure Spring	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0622 0060E	Spring Pin - 2x6mm	
101	0434 0080Z	Tapping Screw - M4x8	
102	0623 0120E	Spring Pin - M3x12	
103	0804 6101	Hexagon Bolt - M3	
104	0314 0200Z	Philips Screw - 4x20	
105	0951 3006Z	Philips Screw With Flat Washer - M3	
106	0314 0100Z	Philips Screw - 4x10	
107	0313 0040Z	Philips Pan Head Screw - M3x4	
108	0951 4006Z	Philips Screw With Flat Washer - M4	
109	0720 0080Z	Retaining Ring - M8	
110	0720 0040Z	Retaining Ring - M4	
111	0725 0220Z	Retaining Ring - M22	
112	0740 3007	Ball Bearing - 7x19x6mm	
113	0807 5004	Washer	
114	0713 0040B	Hexagon Nut - M4	
115	0951 3004Z	Philips Screw With Flat Washer-M3x4	
116	0623 0080E	Spring Pin - 3x8mm	
117	0701 0040Z	Flat Washer - M4	
118	0594 0060E	Socket Screw - 4X6	
119	0713 0050B	Hexagon Nut - M5	
120	0623 0100E	Spring Pin - 3x10mm	
121	0700 0060G	Flat Washer - M6	
122	0720 0050Z	Retaining Ring - M5	
123	0623 0140E	Spring Pin - 3x14mm	

Index No.	Part No.	Description	Q'ty Per Assembly

14. PAPER DELIVERY SECTION 4 (C223)

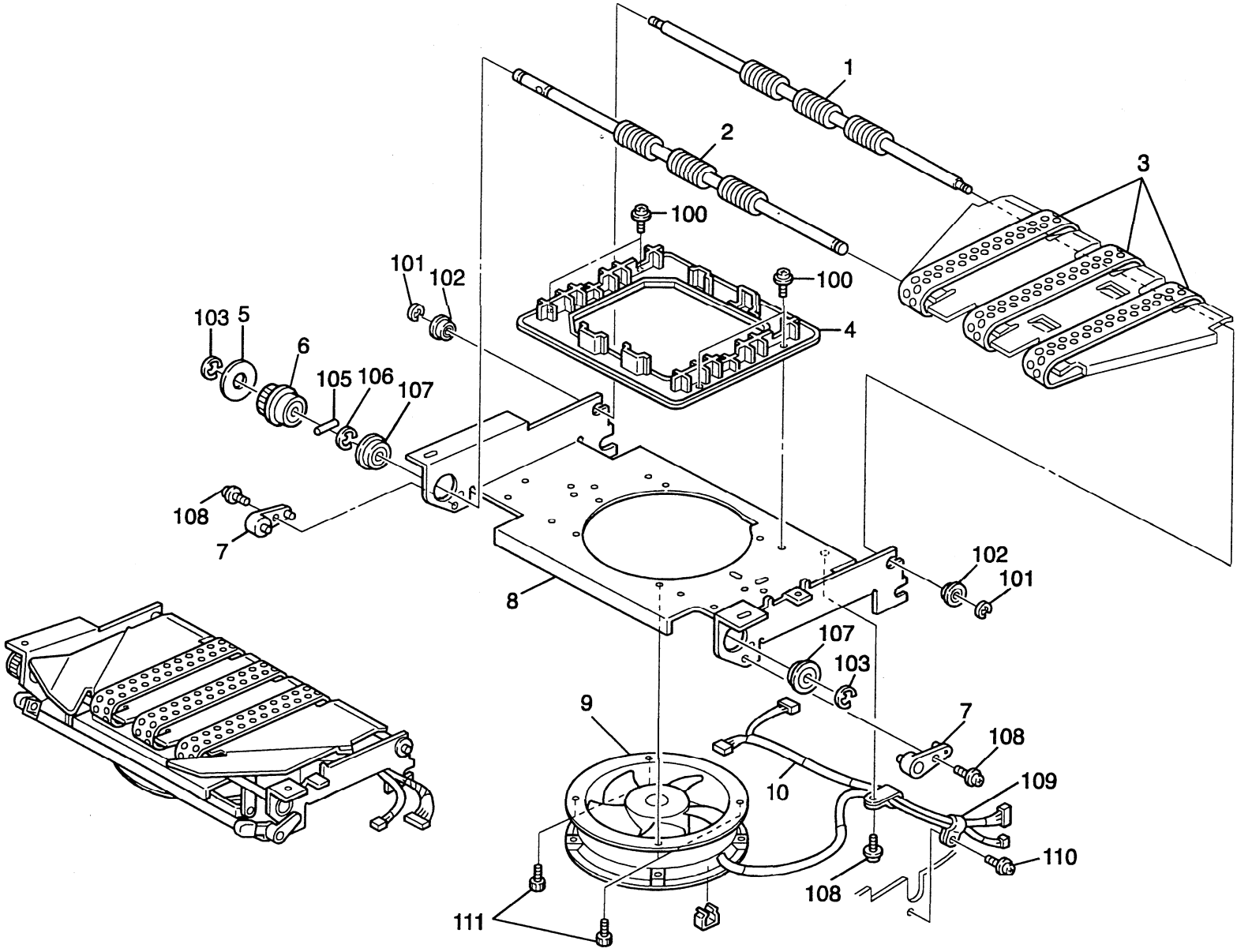


14. PAPER DELIVERY SECTION 4 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 5507	Sensor Actuaitor	1
2	C200 5526	Print Pressure Bushing	2
3	C221 5573	Pressure On/off Lever	1
4	C218 5555	Transfer Roller	1
5	C223 5529	Support Stay	2
6	C223 5549	Rear Guide Plate	2
7	C223 5521	Left Pressure Arm	1
8	C223 5528	Pressure Stay	1
9	C223 5525	Right Pressure Arm	1
10	C221 5570	Adjusting Plate - Exit Pawl	1
11	C223 6004	Stripper Pawl Cam	1
12	5607 2814	Roller Spring	1
13	C223 5603	Pressure Shaft - A3	1
14	C218 5554	Press Roller Ass'y	1
15	C200 5566	Pressure On/off Lever	1
16	C200 5541	Print Pressure Arm	1
17	C209 5521	Joint Shaft	1
18	C209 5543	Press Roller Spring Link	1
19	C218 5526	Spring	1
20	C219 2306	Drum Sensor Bracket	1
21	AW02 0021	Photointerruptor - 175487-3	1
22	C222 8236	Press Roller Solenoid	1
23	C223 5574	Solenoid Bracket	1
24	C223 5573	Drive Arm	1
25	C222 5254	Solenoid Support Bracket	1
26	C222 5275	Tension Spring	1
27	AA14 3062	Shoulder Screw - M4	1
28	C223 5564	Sheet Bracket	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4008Z	Philips Screw With Flat Washer M4x8	
101	0720 0120Z	Retaining Ring - M12	
102	0314 0100Z	Philips Screw - 4x10	
104	0720 0060Z	Retaining Ring - M6	
105	0740 3007	Ball Bearing - 7x19x6mm	
106	0586 0451Z	Hexagon Bolt - M6x45	
107	0584 0121Z	Hexagon Bolt - M4x12	
108	0710 0040Z	Hex Nut 4	
109	0594 0060E	Socket Screw - 4X6	
110	0701 0040Z	Flat Washer - M4	
111	0433 0080Z	Tapping Screw - M3x8	
112	0313 0060Z	Philips Pan Head Screw - M3x6	
113	0584 0101Z	Hexagon Bolt - M4x10	
114	0595 0140E	Hexagon Bolt - M5x14	
115	0804 4060	Spring Pin - M4x22	
116	0740 3206	Ball Bearing - 6x19x6	
117	0720 0040Z	Retaining Ring - M4	
118	0720 0030Z	Retaining Ring - M3	
119	0951 3004Z	Philips Screw With Flat Washer-M3x4	
120	0960 3006Z	Philips Flange Screw - M3x6	
121	0623 0100E	Spring Pin - 3x10mm	
122	1105 0021	Cord Clamper	

15. DELIVERY TABLE 1 (C223)

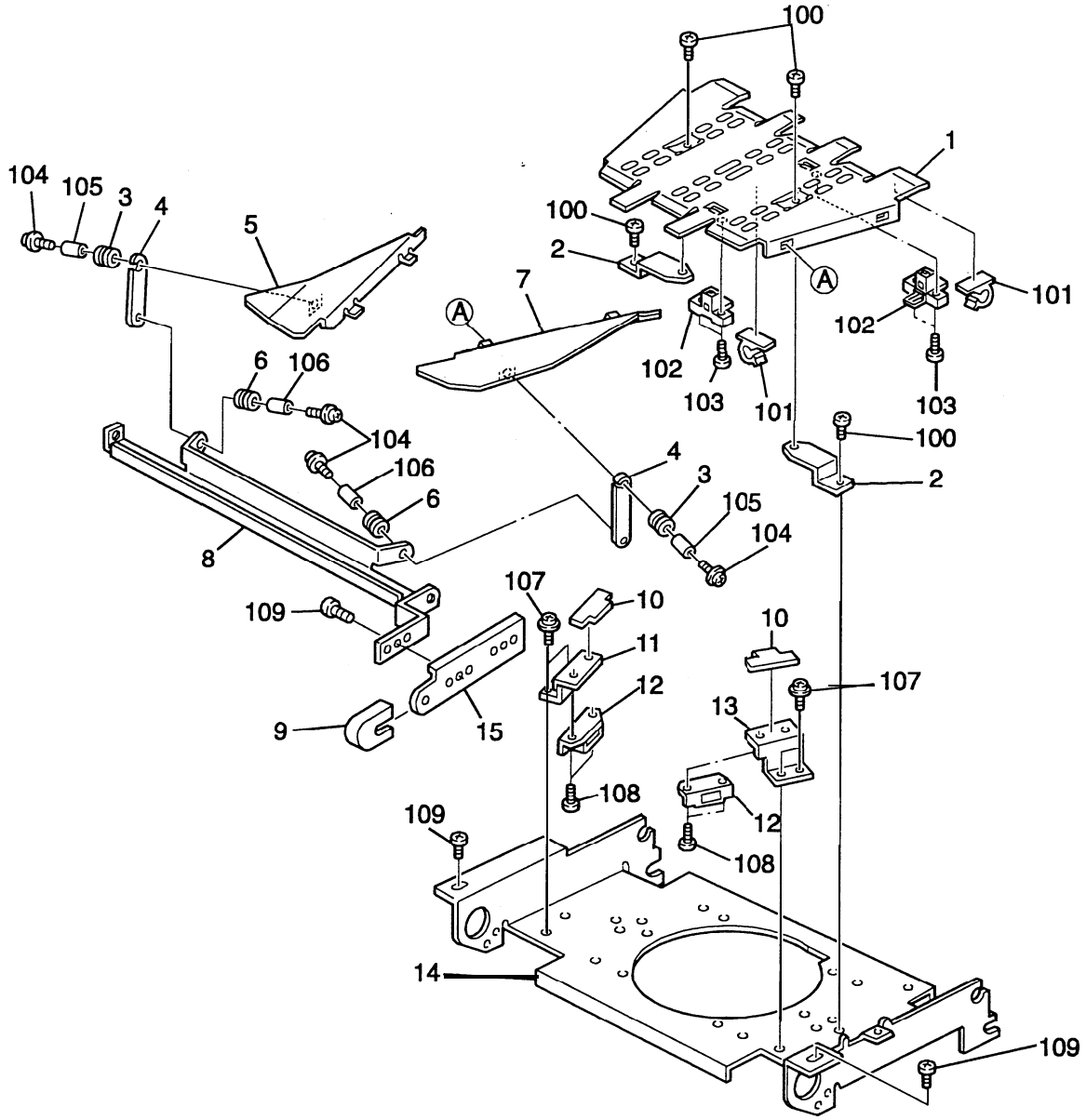


15. DELIVERY TABLE 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 6019	Idler Roller - Transport Belt	1
2	C209 6009	Drive Roller - Transport Belt	1
3	C209 6016	Transport Belt	3
4	C209 6017	Vacuum Duct	1
5	C203 6065	Pulley Flange	1
6	C219 6080	Adjusting Lever Shaft	1
7	C209 6052	Drive Roller Arm	2
8	C221 6002	Vacuum Base	1
9	C209 8204	Vacuum Fan Motor	1
10	C209 8107	Brower Moter Harness	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4008Z	Philips Screw With Flat Washer M4x8	
101	0720 0040Z	Retaining Ring - M4	
102	0741 3506	Ball Bearing - 6x12x4 Mm	
103	0720 0080Z	Retaining Ring - M8	
105	0623 0160E	Spring Pin - 3x16mm	
106	0720 0080E	Retaining Ring - M8	
107	0805 3452	Ball Bearing - 10x22x6mm	
108	0951 4008Z	Philips Screw With Flat Washer M4x8	
109	1105 0016	Nylon Clip - 4n	
110	0960 4008Z	Flange Head Screw - 4 X 8	
111	0594 0120E	Hexagon Bolt - M4x12	

16. DELIVERY TABLE 2 (C223)

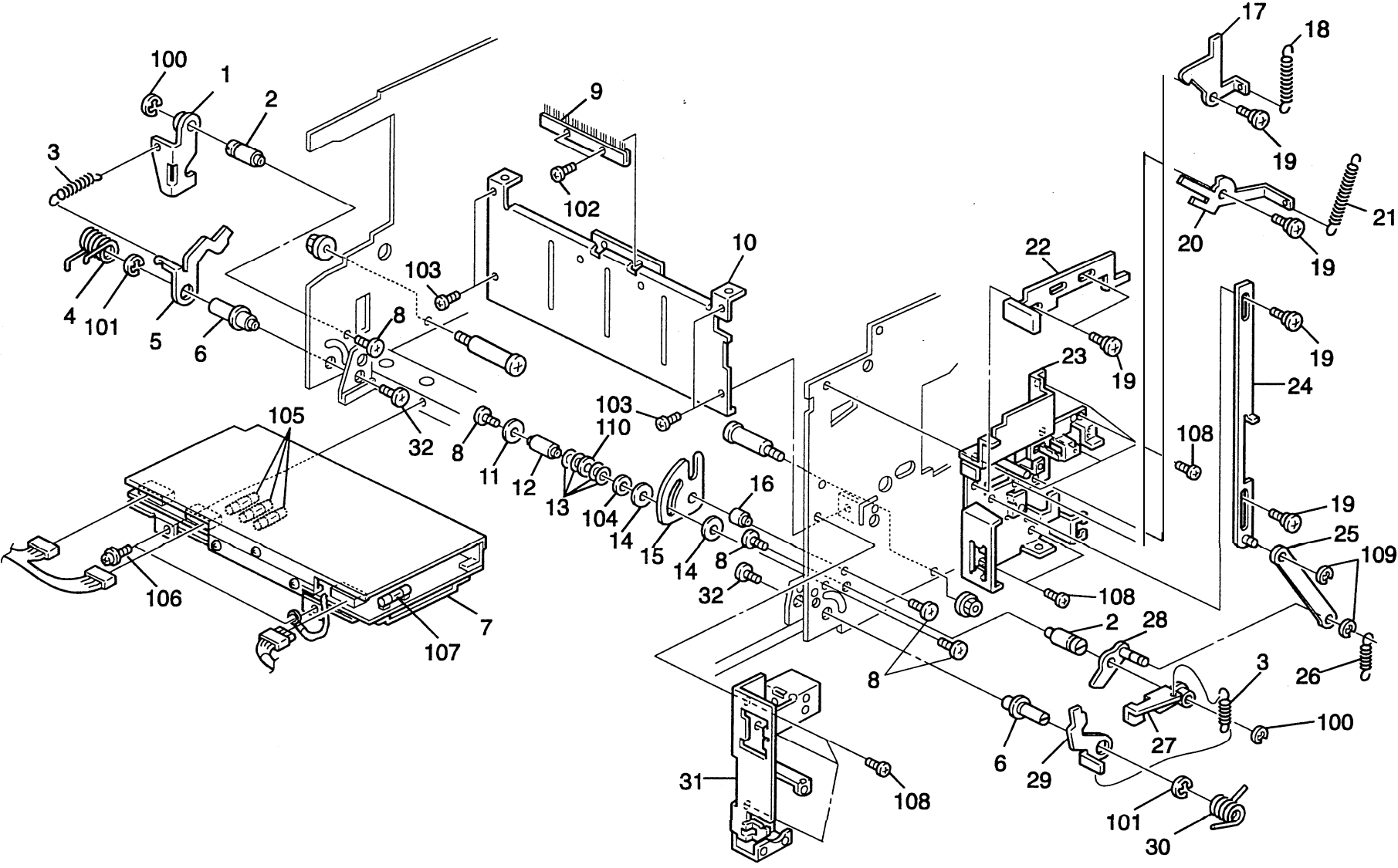


16. DELIVERY TABLE 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 6005	Vacuum Plate	1
2	C209 6003	Vacuum Plate Bracket	2
3	C203 6047	Rubber Washer	2
4	C203 6046	Link - Wing	2
5	C209 6028	Transport Right Wing	1
6	C209 6050	Bushing - 4x8x6 mm	2
7	C209 6025	Transport Left Wing	1
8	C221 6051	Support Arm	1
9	C209 4059	Lever Knob	1
10	C203 6035	Magnet Plate	2
11	C221 6037	Right Support Plate	2
12	AG07 0004	Magnetic Catch	1
13	C221 6038	Left Support Plate	1
14	C221 6002	Vacuum Base	1
15	C221 6048	Small Arm	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0434 0080Z	Tapping Screw - M4x8	
101	1105 0172	Clamp	
102	1403 0691	Photo Sensor	
103	0313 0100Z	Philips Pan Head Screw - M3x10	
104	0951 3012Z	Philips Screw W/h Flat Washer-M3x12	
105	0707 3050B	Bushing - 3x5mm	
106	0707 3080B	Bushing - M3x8	
107	0964 3006Z	Tapping Screw With Flat Washer - M3	
108	0313 0040Z	Philips Pan Head Screw - M3x4	
109	0314 0080Z	Philips Screw - 4x8	

17. PAPER EXIT SECTION 1 (C223)

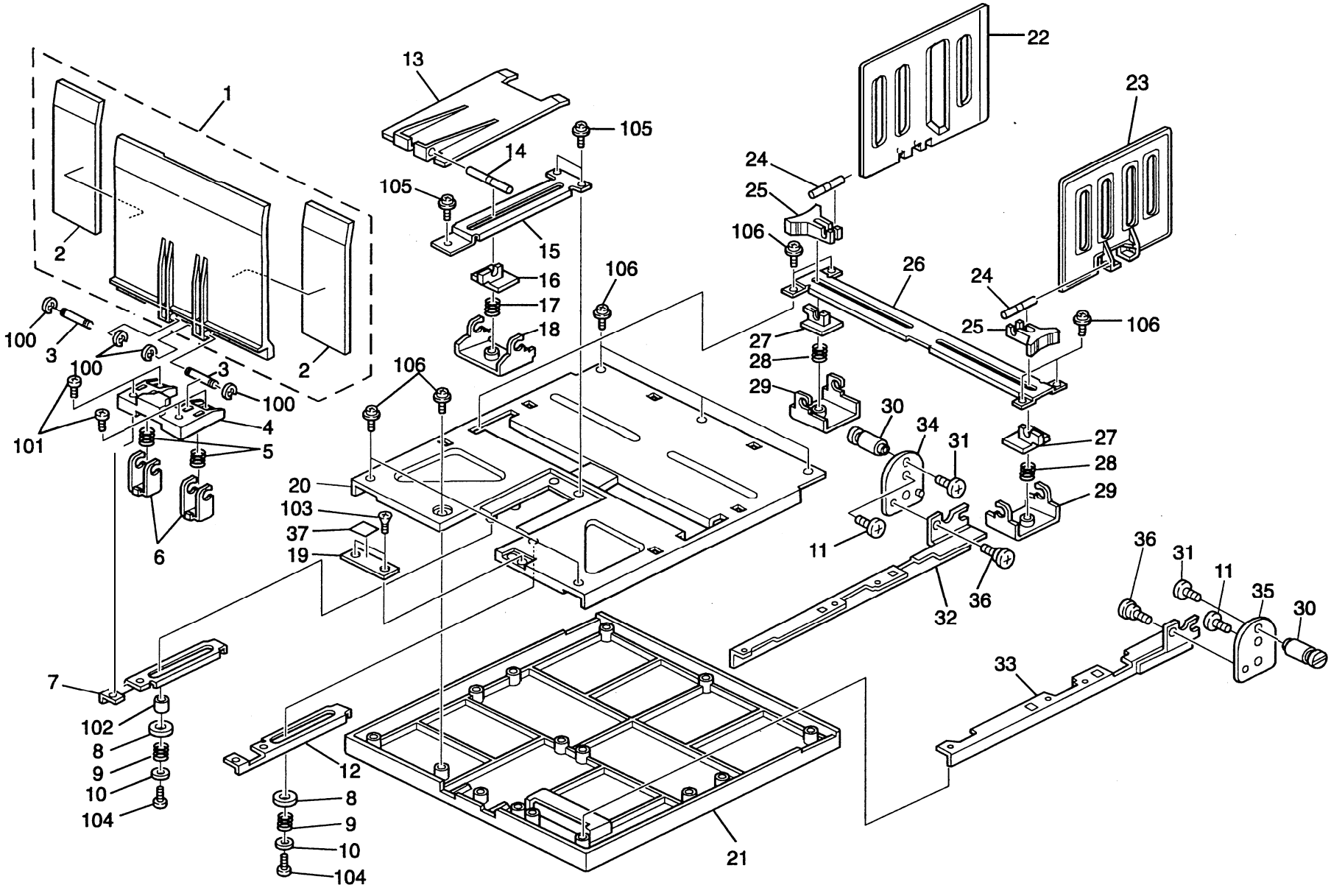


17. PAPER EXIT SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 6110	Right Exit Cam	1
2	C209 6104	Exit Cam Shaft	2
3	C209 6114	Tension Spring	2
4	C209 6116	Right Adjusting Lever Spring	1
5	C209 6113	Right Adjusting Lever	1
6	C221 6118	Adjusting Lever Shaft	2
7	C222 8301	Power Supply Unit	1
8	5506 6197	Screw - Knife Cam - Leading Edge CL	5
9	C219 6084	Antistatic Brush	1
10	C221 6081	Paper Delivery Plate	1
11	C209 6179	Spacer - 4x18x2	1
12	C209 6177	Stud - M4x11	1
13	C209 6180	Spring Washer - M8	4
14	C209 6178	Spacer 8x20x2	14
15	C209 6176	Delivery Table Angle	1
16	C209 6175	Stud - M4	1
17	C200 3953	Middle Lever	1
18	C200 3956	Middle Lever Spring	1
19	C219 3950	Stepped Screw	6
20	C200 3954	Lower Lever	1
21	C200 3957	Lower Lever Spring	1
22	C218 2160	Upper Lever	1
23	C218 2164	2nd Left Side Plate	1
24	C209 6188	Sensor Actuator - Delivery Table	1
25	C209 6196	Actuator Link - Delivery Table	1
26	5501 7559	Spring - Master Feed	1
27	C209 6107	Left Exit Cam	1
28	C209 6193	Lock Arm - Delivery Table Sensor	1
29	C209 6112	Left Adjusting Lever	1
30	C209 6115	Left Adjusting Lever Spring	1
31	C219 2109	Key Counter Bracket	1
32	5603 1045	Screw - M5	2

Index No.	Part No.	Description	Q'ty Per Assembly
100	0720 0060Z	Retaining Ring - M6	
101	0720 0100Z	Retaining Ring - M10	
102	0313 0040Z	Philips Pan Head Screw - M3x4	
103	0314 0080Z	Philips Screw - 4x8	
104	0701 0080Z	Flat Washer - M8	
105	1107 0415	Fuse 5A	
106	0951 3008Z	Philips Screw With Flat Washer - M3	
107	1107 0354	Fuse - 3.15A 125V	
108	0434 0080Z	Tapping Screw - M4x8	
109	0720 0040Z	Retaining Ring - M4	
110	0807 5013	Flat Washer - M8.4	

18. PAPER EXIT SECTION 2 (C223)

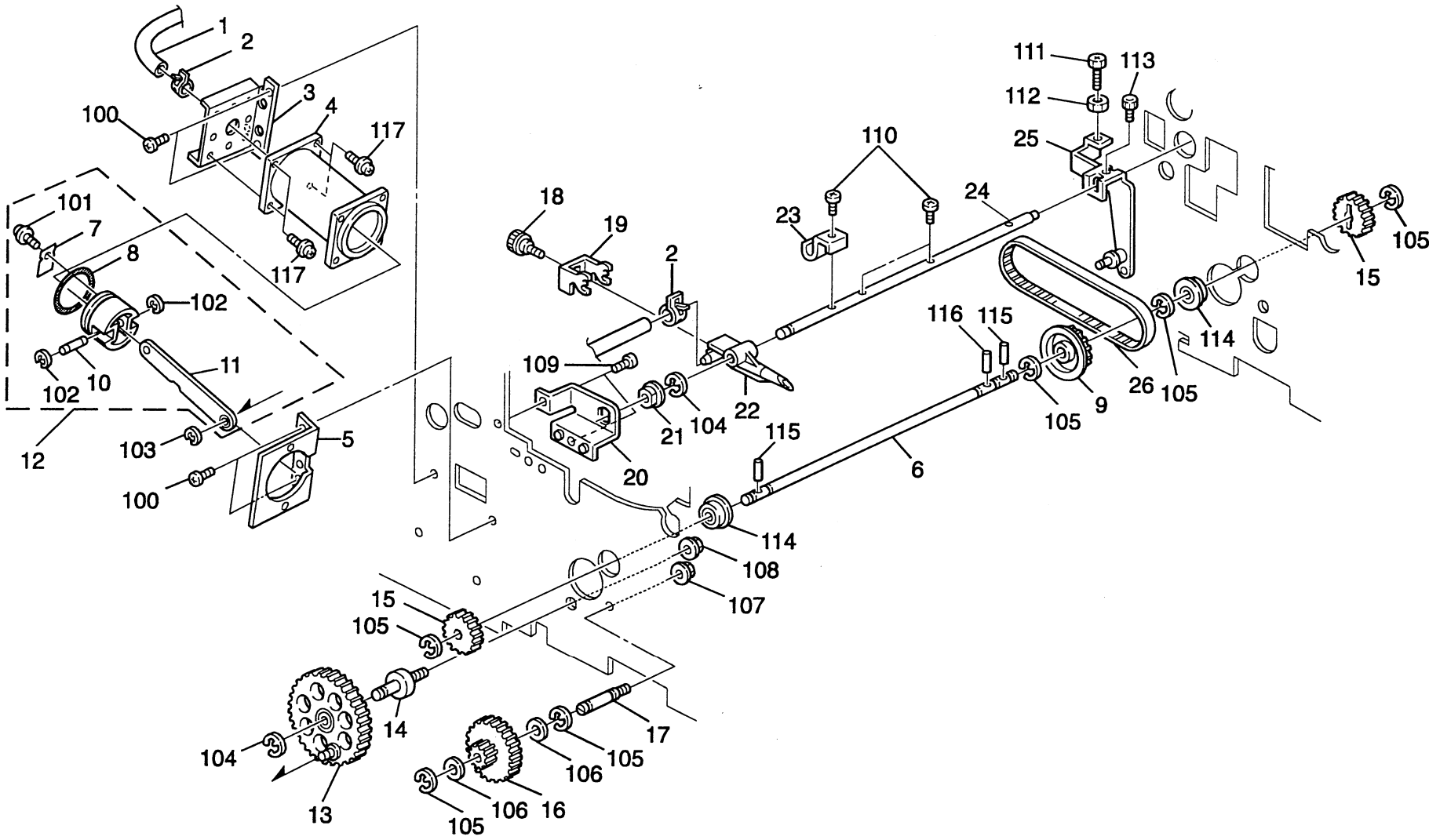


18. PAPER EXIT SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C222 6101	Delivery Table Unit (LT)	1
*	C222 6265	Delivery Table Unit (A4)	1
1	C209 6184	End Fence	1
2	C209 6156	Sponge Seal - 4.5x65x175	2
3	C209 6157	End Fence Shaft	2
4	C209 6160	End Fence Base	1
5	C209 6159	End Fence Spring - Large	2
6	C209 6158	End Fence Bracket	2
7	C209 6162	Right Rail - End Fence (A4)	1
7	C210 6255	Right Rail - End Fence (LT)	1
8	C209 6163	Spacer - 10x18x1	2
9	C209 6164	Rail Spring - End Fence	2
10	C209 6168	End Fence Washer	2
11	5603 1045	Screw - M5	2
12	C209 6161	Left Rail - End Fence (A4)	1
12	C210 6254	Left Rail - End Fence (LT)	1
13	C209 6183	Small End Fence	1
14	C209 6144	Guide Fence Shaft	1
15	C209 6151	End Fence Support Rail	1
16	C209 6142	Guide Fence Slider	1
17	C209 6150	End Fence Spring	1
18	C209 6153	Bracket - Support End Fence	1
19	C209 6136	Magnet Plate	1
20	C210 6253	Delivery Table (LT)	1
20	C210 6262	Delivery Table (A4)	1
21	C218 6119	Delivery Table Cover	1
22	C209 6181	Front Guide Plate	1
23	C209 6182	Rear Guide Fence	1
24	C209 6144	Guide Fence Shaft	2
25	C209 6143	Guide Fence Knob	2
26	C209 6141	Guide Fence Rail	1
27	C209 6142	Guide Fence Slider	2
28	C209 6149	Guide Fence Spring	2
29	C209 6145	Guide Fence Bracket	2
30	C209 6126	Stud - M4	2

Index No.	Part No.	Description	Q'ty Per Assembly
31	5506 6197	Screw - Knife Cam - Leading Edge CL	2
32	C221 6131	Right Stay - Delivery Table	1
33	C221 6130	Left Stay - Delivery Table	1
34	C221 6128	Support Plate - Right Stay	1
35	C221 6127	Support Plate - Left Stay	1
36	5607 3927	Stepped Screw - M3x8	2
37	C209 6137	Magnet Catch Cover	1
100	0720 0030Z	Retaining Ring - M3	
101	0343 0060W	Philips Pan Head Screw - M3x6	
102	0707 8105B	Bushing - M8x10.5	
103	0323 0060Z	Philips Sunk Screw - M3x6	
104	0313 0060Z	Philips Pan Head Screw - M3x6	
105	0965 3012W	Tapping Screw With Flat Washer - M3	
106	0965 3012W	Tapping Screw With Flat Washer - M3	

19. PAPER EXIT SECTION 3 (C223)

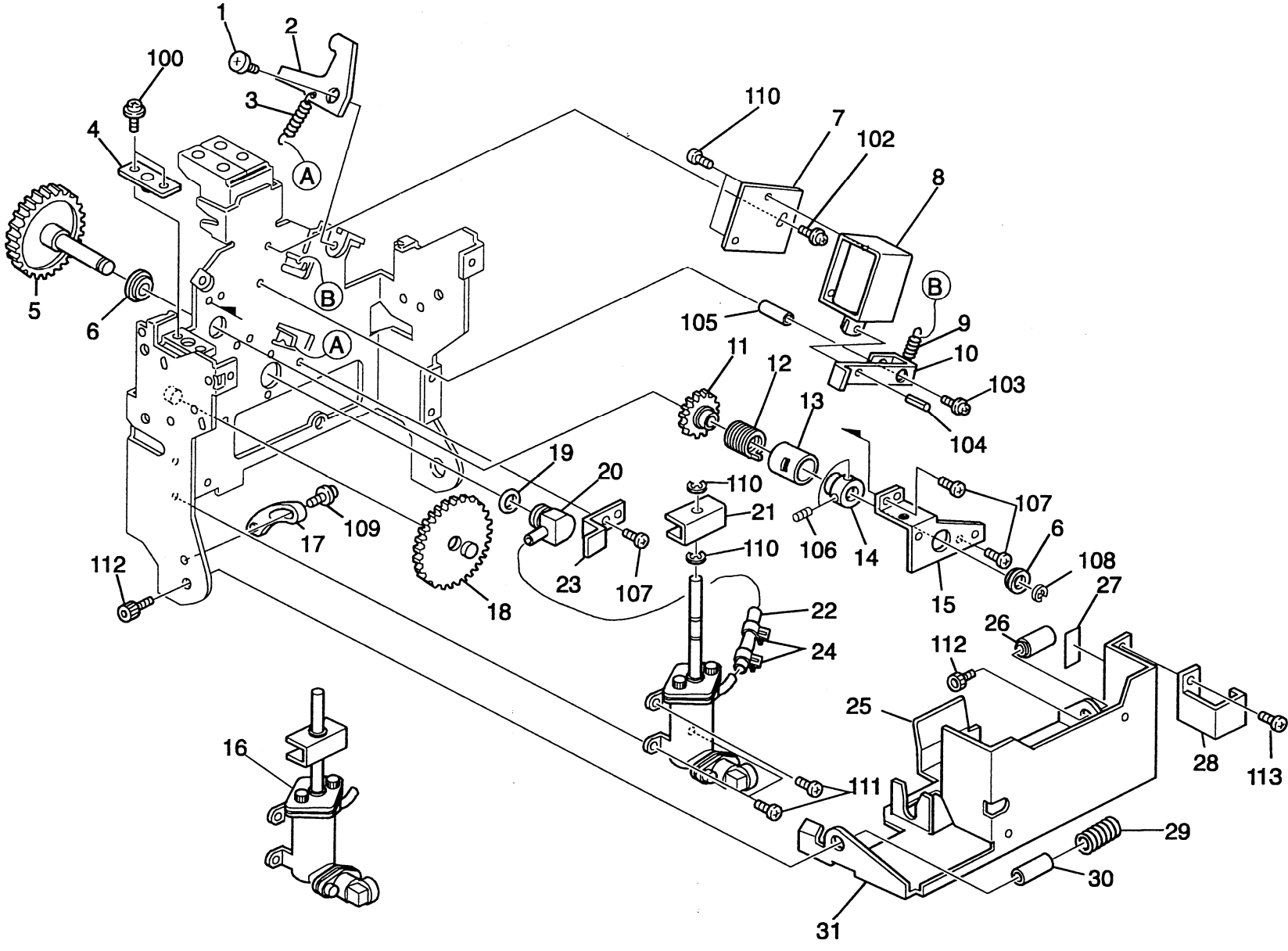


19. PAPER EXIT SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 6219	Air Hose	1
2	C209 4711	Hose Band	2
3	C209 6241	Front Cylinder Bracket	1
4	C209 6240	Air Pump Cylinder	1
5	C209 6242	Rear Sylinder Bracket	1
6	C209 6065	Drive Shaft - Vacuum Roller	1
7	C209 6215	Piston Valve	1
8	C209 6216	O-Ring - 34	1
9	C200 6059	Pulley - 25T	1
10	C209 6213	Piston Pin - Air Pump	1
11	C209 6211	Piston Link	1
12	C209 6203	Air Piston Ass'y	1
13	C209 6207	Gear - 75Z	1
14	C209 6210	Air Pump Drive Shaft	1
15	C209 6064	Gear - 28Z	2
16	C209 6204	Gear - 18/48Z	1
17	C209 6206	Gear Shaft	1
18	C209 6231	Knob Screw - M4	1
19	C209 6230	Exit Pawl Holder	1
20	C209 6223	Exit Pawl Bracket	1
21	5053 0223	Bushing - 8mm	1
22	C209 6233	Exit Pawl	1
23	C209 6225	Hose Clamp	1
24	C209 6232	Exit Pawl Shaft	1
25	C200 6004	Exit Pawl Lever	1
26	C209 6067	Timing Belt - 220XL025G	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0314 0080Z	Philips Screw - 4x8	
101	0433 0060W	Tapping Screw - M3x6	
102	0720 0030Z	Retaining Ring - M3	
103	0720 0040Z	Retaining Ring - M4	
104	0720 0060Z	Retaining Ring - M6	
105	0720 0080Z	Retaining Ring - M8	
106	0807 7013	Spacer - 10.2 X 14 X 0.2 mm	
107	0713 0050B	Hexagon Nut - M5	
108	0713 0080B	Flanged Hexagon Nat - M8	
109	0314 0050Z	Philips Pan Head Screw - M4x5	
110	0313 0060Z	Philips Pan Head Screw - M3x6	
111	0584 0121Z	Hexagon Bolt - M4x12	
112	0710 0040Z	Hex Nut 4	
113	0593 0080E	Bolt - M3x8	
114	0805 3452	Ball Bearing - 10x22x6mm	
115	0623 0160E	Spring Pin - 3x16mm	
116	0623 0180E	Spring Pin - 3x18mm	
117	0960 4008Z	Flange Head Screw - 4 X 8	

20. DRUM SECTION 1 (C223)

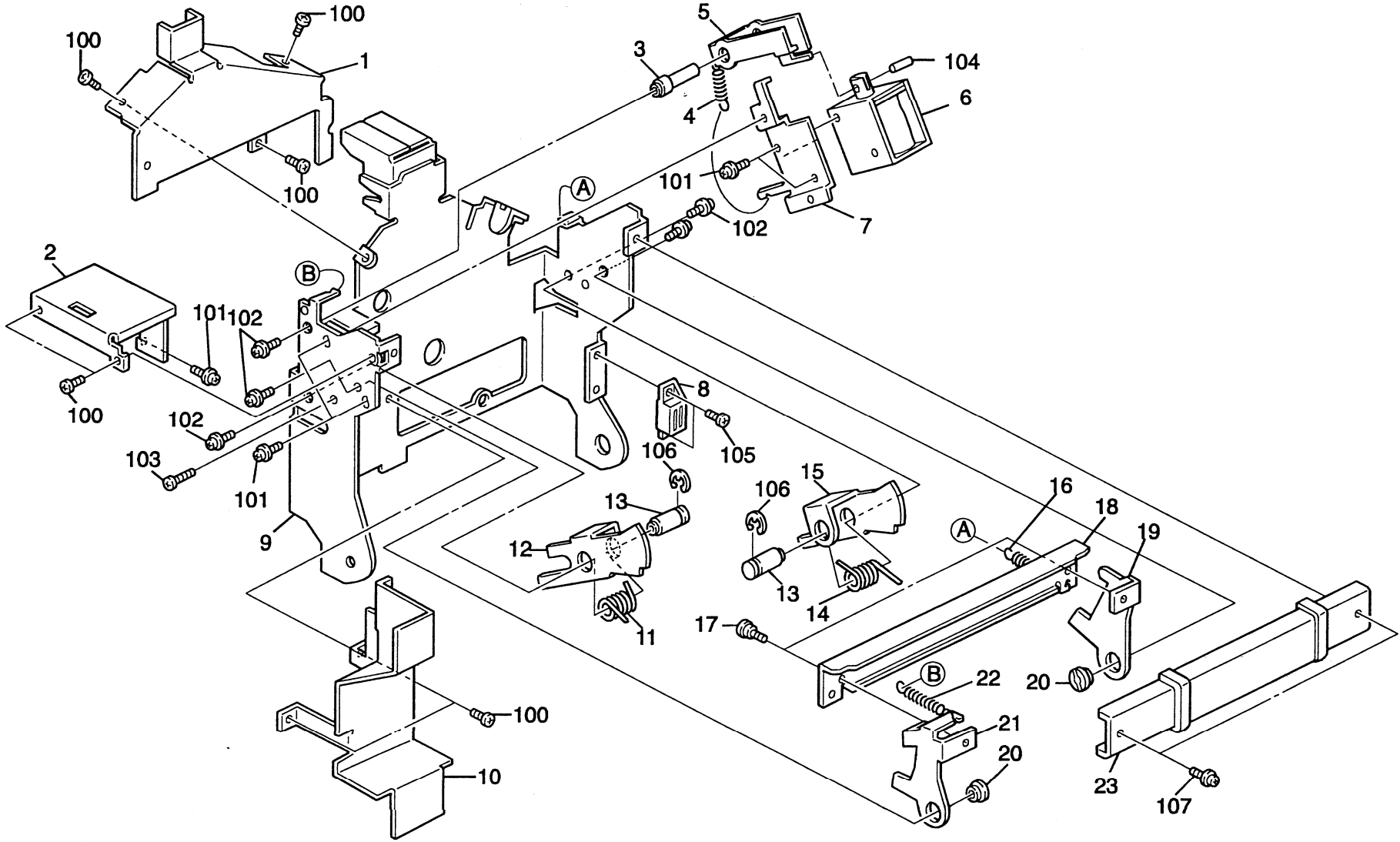


20. DRUM SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	5413 1882	Stepped Screw	1
2	C209 4529	Drum Stopper	1
3	C200 4914	Drum Stopper Spring	1
4	C200 4814	Bushing - 6x10x55mm	1
5	C209 4852	Gear - 46Z	1
6	5507 6624	Bushing - 8x16x45mm	2
7	C200 4864	Bracket - Ink Supply Solenoid	1
8	C209 8227	Ink Supply Solenoid	1
9	5505 3598	Spring - Ratch - Control Section	1
10	C200 4862	Ink Stopper	1
11	C209 4674	Gear - 25Z	1
12	C201 4676	Clutch Spring	1
13	C200 4861	Pump Clutch Sleeve	1
14	C201 4067	Pump Clutch Collar	1
15	C209 4677	Clutch Bracket	1
16	C222 4670	Ink Pump (RIC)(NRG)(SVN)	1
16	C222 4680	Ink Pump (AB DICK)	1
17	C200 4926	Ink Holder Cam	1
18	C209 4867	Gear - 64Z	1
19	0808 0021	Rubber Ring	1
20	C213 4810	Ink Antechamber	1
21	C201 4679	Ink Pump Slider	1
22	C209 4817	Ink Tube - Small	1
23	C209 4816	Stopper Plate - Ink Antechamber	1
24	C209 4711	Hose Band	2
25	C200 4826	Pump Rubber	1
26	C209 4923	Right Shaft - Ink Holder	1
27	C209 4930	Seal - 0.1x5x17	1
28	C201 4639	Ink Holder Handle	1
29	C201 4682	Ink Cartridge Spring	1
30	C200 4924	Right Shaft - Ink Holder	1
31	C209 4641	Ink Holder	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4006Z	Philips Screw With Flat Washer - M4	
101	0313 0040Z	Philips Pan Head Screw - M3x4	
102	0960 4006Z	Philips Frang Screw - M4x6	
103	0951 4020Z	Philips Screw With Flat Washer - M4	
104	0623 0080E	Spring Pin - 3x8mm	
105	0707 4160B	Bushing - 4x16mm	
106	0574 0050E	Hexagon Headless Set Screw - M4x5	
107	0434 0060Z	Tapping Screw - M4x6	
108	0720 0060Z	Retaining Ring - M6	
109	0951 4010Z	Philips Screw With Flat Washer M4 X	
110	0720 0050Z	Retaining Ring - M5	
111	0434 0080Z	Tapping Screw - M4x8	
112	0595 0080Z	Bolt - M5x8	
113	0314 0060Z	Philips Pan Head Screw - M4x6	

21. DRUM SECTION 2 (C223)

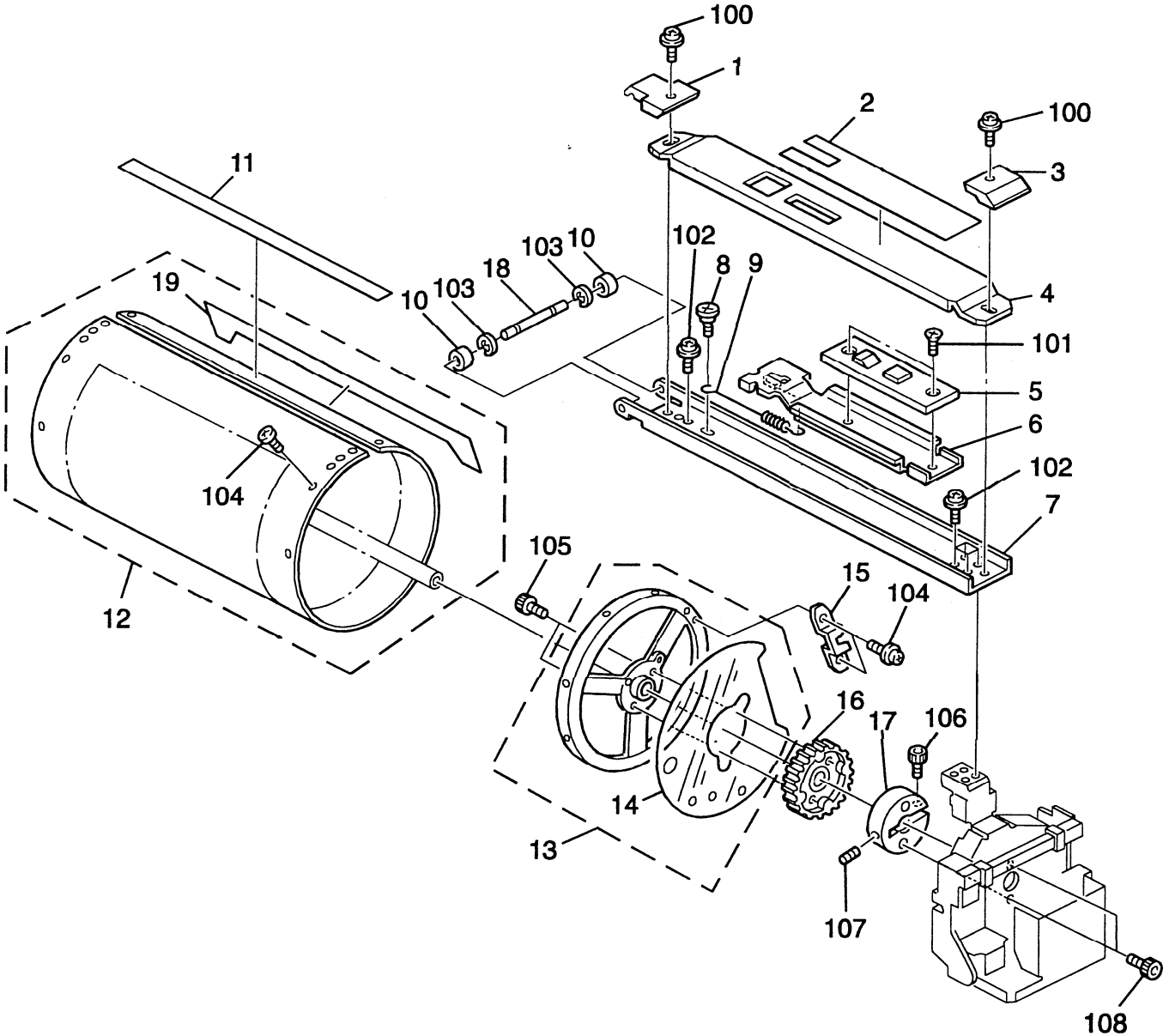


21. DRUM SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 4616	Side Plate Cover - Drum	1
2	C209 4620	Upper Cover - Drum Side Plate	1
3	C209 4566	Drum Lock Shaft	1
4	C200 5118	Release Spring	1
5	C209 4567	Left Arm - Drum Lock	1
6	C209 8234	Drum Lock Solenoid	1
7	C209 4568	Solenoid Bracket - Drum Lock	1
8	5054 0536	Magnet Catch Ass'y	1
9	C209 4624	Front Side Plate	1
10	C209 4617	Lower Cover - Drum Side Plate	1
11	C209 4634	Drum Lock Spring - Left	1
12	C200 4631	Left Arm - Drum Lock	1
13	C200 4633	Drum Lock Shaft - Long	2
14	C200 4635	Drum Lock Spring - Right	1
15	C200 4632	Right Arm - Drum Lock	1
16	5600 1379	Spring	1
17	5400 3404	Stepped Screw	2
18	C209 4639	Release Lever - Drum Lock	1
19	C209 4637	Right Stopper - Drum Lock	1
20	C200 4638	Drum Lock Shaft - Small	2
21	C209 4638	Left Stopper - Drum Lock	1
22	C209 4642	Drum Lock Spring	1
23	C201 4636	Drum Unit Handle	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0434 0060Z	Tapping Screw - M4x6	
101	0951 3005Z	Philips Pan Head Screw - M3 X 5	
102	0960 4006Z	Philips Frang Screw - M4x6	
103	0434 0100Z	Pan Head Self-tapping Screw - M4x10	
104	0623 0080E	Spring Pin - 3x8mm	
105	0314 0060Z	Philips Pan Head Screw - M4x6	
106	0720 0060Z	Retaining Ring - M6	
107	0960 4008Z	Flange Head Screw - 4 X 8	

22. DRUM SECTION 3 (C223)

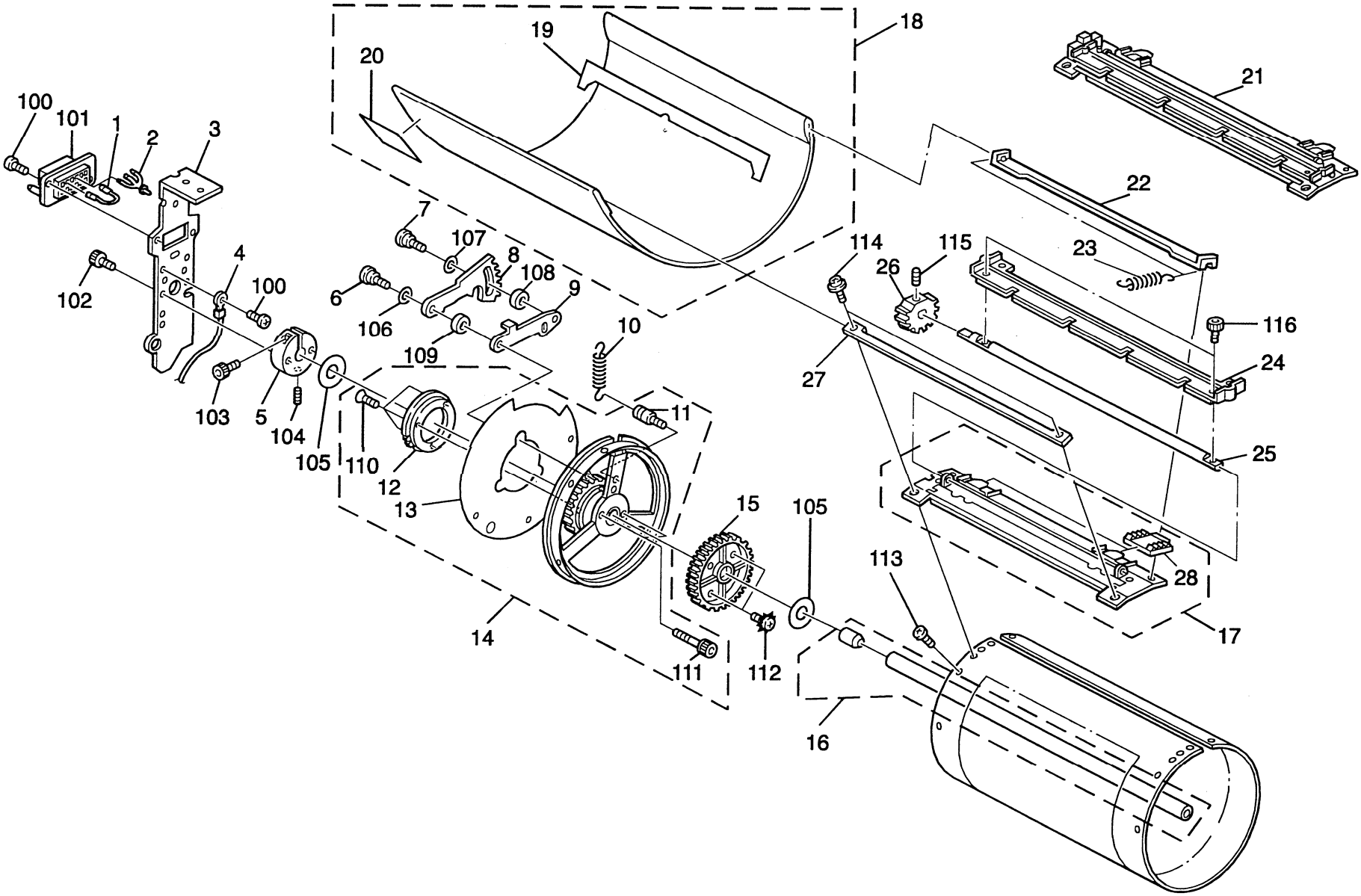


22. DRUM SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 4612	Rear Roller Guide	1
2	C201 2543	Decal - Drum Caution	1
3	C207 4611	Front Stopper Guide (RIC)(NRG)(SVN)	1
3	C201 4611	Front Stopper Guide (AB DICK)	1
4	C201 4613	Drum Rail Cover	1
5	C201 4609	Stopper Relasing Lever	1
6	C201 4606	Stopper Releasing Plate	1
7	C200 4625	Drum Rail	1
8	5506 6111	Stepped Screw - M4	1
9	C201 4610	Drum Slider Spring	1
10	C201 4604	Drum Rail Roller	2
11	2701 0101	Metal Screen Seal	1
12	C223 4801	Metal Screen - DLT	1
13	C219 4648	Front Drum Flange	1
14	C219 4678	Front Drum Flange cover	1
15	C209 4681	Stopper Plate	1
16	C209 4673	Gear - 62Z	1
17	C200 4653	Drum Shaft Bracket	1
18	C200 4627	Drum Rail Shaft	1
19	C209 4814	Metal Screen Mylar	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4008Z	Philips Screw With Flat Washer M4x8	
101	0323 0050Z	Philips Sunken Head Screw - M3x5	
102	0960 4006Z	Philips Frang Screw - M4x6	
103	0720 0050Z	Retaining Ring - M5	
104	0951 4006Z	Philips Screw With Flat Washer - M4	
105	0595 0080E	Hexagon Bolt - M5x8	
106	0595 0140E	Hexagon Bolt - M5x14	
107	0575 0080E	Hexagon Headless Set Screw - M5x8	
108	0594 0080Z	Bolt - M4x8	

23. DRUM SECTION 4 (C223)

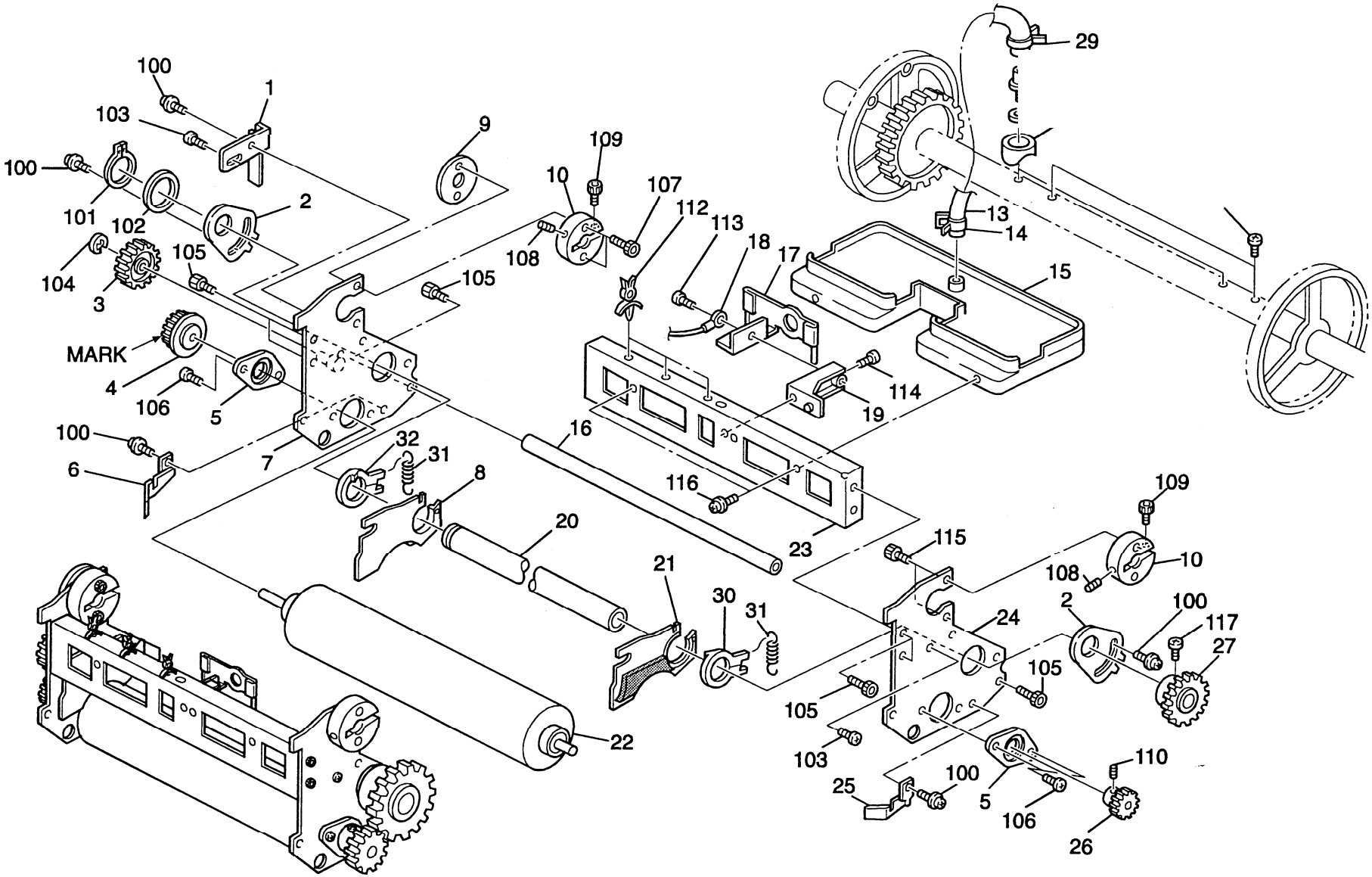


23. DRUM SECTION 4 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 8169	Short Harness	1
2	C526 8172	Relay Harness (Option Drum)	1
3	C209 4613	Rear Side Plate - Drum	1
4	C209 8140	Grounding Wiar - 65mm	1
5	C200 4653	Drum Shaft Bracket	1
6	5506 6069	Step Screw - Etching Middle Roller	1
7	C200 4946	Clamper Secter Shaft	1
8	C200 4944	Sector Gear - 9T	1
9	C209 4689	Interrupter Plate	1
10	C200 4945	Sector Gear Spring	1
11	5413 2274	Spring Aunchor - Release Lever	1
12	C209 4688	Gear Support Plate	1
13	C219 4679	Rear Seald - Drum Flange	1
14	C218 4565	Rear Drum Flange	1
15	C209 4672	Gear - 50Z	1
16	C209 4531	Drum Shaft	1
17	C218 4945	Drum Clamper Base Ass'y	1
18	C223 4836	Tetron Screen - DLT	1
19	C209 4850	Screen mylar	1
20	C209 4550	Black Seal - 40x50	1
21	C218 4936	Drum Clamper Ass'y	1
22	C218 4683	Screen Rear Plate	1
23	C209 4540	Screen Plate Spring	2
24	C209 4938	Clamper Magnet	1
25	C209 4941	Clamper Shaft	1
26	C200 4942	Pinion - 9T	1
27	C209 4682	Screen Front Plate	1
28	C209 4947	Clamper Rubber	2

Index No.	Part No.	Description	Q'ty Per Assembly
100	0314 0080Z	Philips Screw - 4x8	
101	1102 2098	Connector - 12p	
102	0594 0080Z	Bolt - M4x8	
103	0595 0140E	Hexagon Bolt - M5x14	
104	0575 0080E	Hexagon Headless Set Screw - M5x8	
105	0807 7114	Washer - 16x24x0.3mm	
106	0807 5044	Spacer - 8.1mm X 11.5mm X 0.2	
107	0807 4126	Flat Washer - 6.2x12x0.2mm	
108	0807 3103	Washer - 4x13x2.3mm	
109	0807 5076	Washer - 8x13x2.2mm	
110	0323 0060Z	Philips Sunk Screw - M3x6	
111	0804 6092	Hexagonal Set Screw	
112	0952 4008W	Philips Screw - M4x8	
113	0951 4006Z	Philips Screw With Flat Washer - M4	
114	0951 4008Z	Philips Screw With Flat Washer M4x8	
115	0574 0050E	Hexagon Headless Set Screw - M4x5	
116	0804 6091	Hexagonal Set Screw - M2x5	

24. DRUM SECTION 5 (C223)

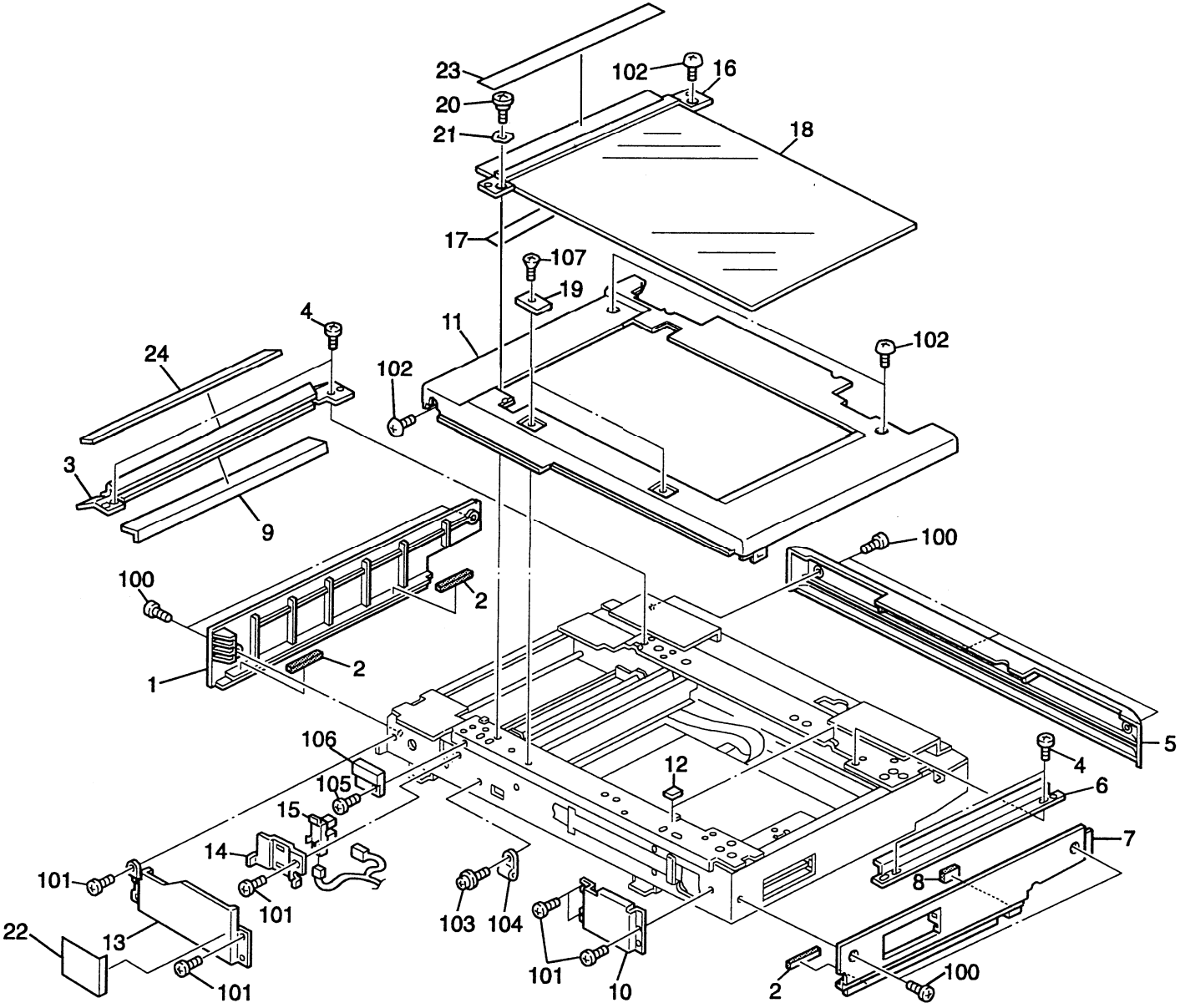


24. DRUM SECTION 5 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 4749	Grounding Plate	1
2	C200 4723	Adjusting Plate - Doctor Roller	2
3	C207 4672	Gear - 36Z	1
4	C207 4670	Gear - 24Z	1
5	C201 4665	Bearing Holder	2
6	C217 4599	Rear Drum Blade	1
7	C209 4662	Rear Side Plate - Ink Roller	1
8	C218 4594	Rear Bank Plate	1
9	C209 4654	Spacer - 16x36x5.7	1
10	C200 4653	Drum Shaft Bracket	2
11	C218 4701	Ink Tube nipple	1
12	C209 4704	Packing - Ink Tube	1
13	C218 4698	Ink Distributor & Tube Ass'y	1
14	C209 4711	Hose Band	1
15	C209 4705	Ink Distributor	1
16	C209 4715	Shaft Stay - Ink Roller	1
17	C203 4543	Ink Detector	1
18	C209 8137	Relay Harness - Ink Detection	1
19	C200 4733	Ink Detector Bracket	1
20	C209 4722	Doctor Roller	1
21	C218 4592	Front Bank Plate	1
22	C209 4666	Ink Roller	1
23	C209 4664	Ink Roller Stay	1
24	C209 4661	Front Side Plate - Ink Roller	1
25	C217 4598	Front Drum Blade	1
26	C200 3629	Gear - 20T	1
27	C200 4748	Gear - 45T	1
28	C209 4712	Spacer	1
29	C209 4713	Hose Band	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4006Z	Philips Screw With Flat Washer - M4	
101	0725 0160E	Retaining Ring C - M16	
102	0807 7114	Washer - 16x24x0.3mm	
103	0314 0080Z	Philips Screw - 4x8	
104	0720 0050Z	Retaining Ring - M5	
105	0594 0060E	Socket Screw - 4X6	
106	0313 0040Z	Philips Pan Head Screw - M3x4	
107	0594 0200E	Hexagon Bolt - M4x20	
108	0575 0080E	Hexagon Headless Set Screw - M5x8	
109	0595 0140E	Hexagon Bolt - M5x14	
110	0573 0040E	Hexagon Headless Set Screw - M3x4	
111	0314 0120Z	Philips Screw - 4x12	
112	1105 0209	Clamp	
113	0434 0082Z	Tapping Screw - M4x8	
114	0314 0060Z	Philips Pan Head Screw - M4x6	
115	0594 0080E	Bolt - M4x8	
116	0951 4008Z	Philips Screw With Flat Washer M4x8	
117	0313 0050Z	Philips Screw - 3x5	

25. SCANNER SECTION 1 (C223)

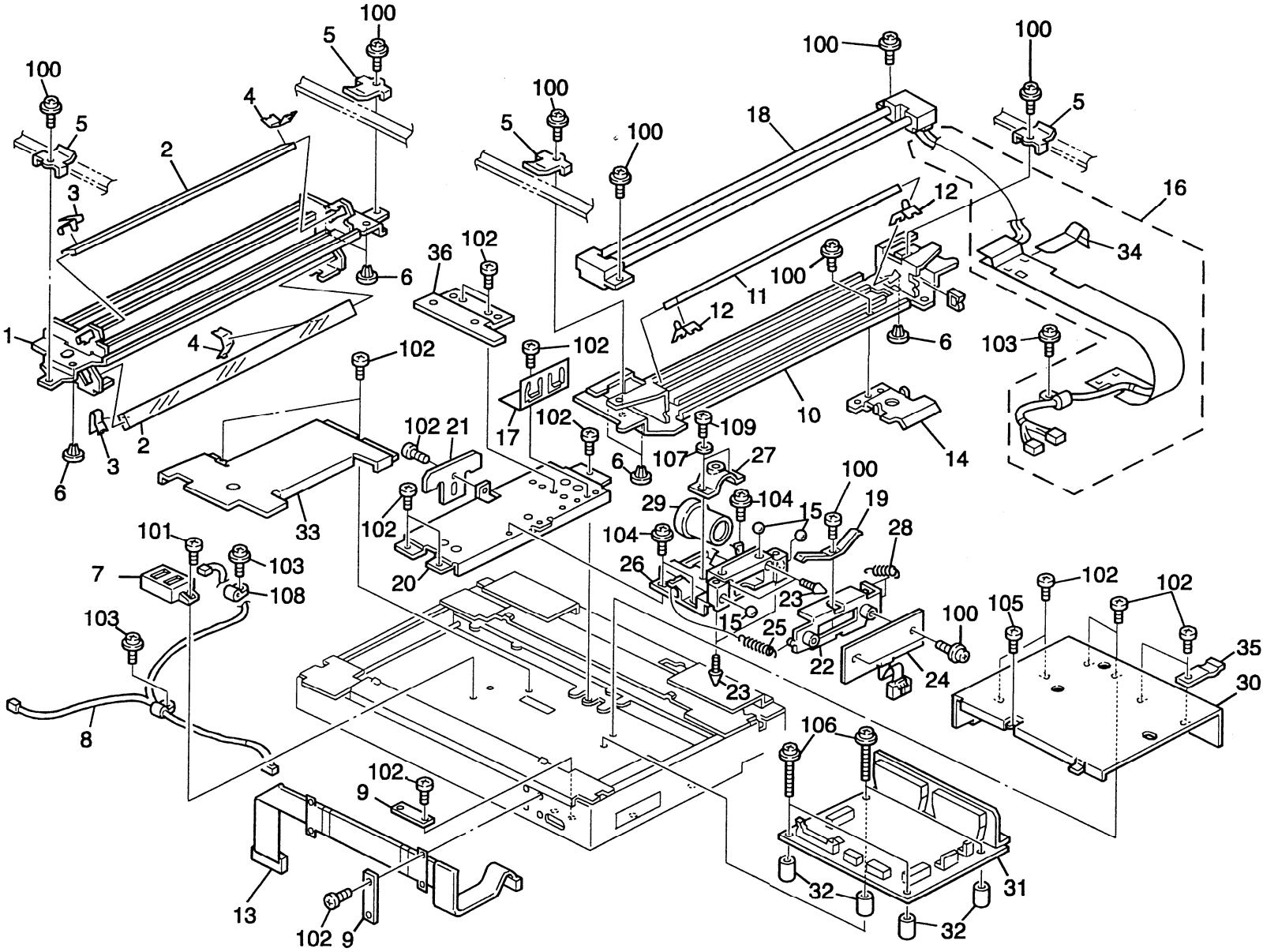


25. SCANNER SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 2535	Scanner Left Cover	1
2	C218 2522	Cushion - Large	3
3	C218 3046	Original Exit Guide	1
4	5875 2088	Shoulder Screw - M4	4
5	C218 2560	Scanner Rear Cover	1
6	C218 3041	Right Bracket	1
7	C218 2515	Scanner Right Cover	1
8	C218 2524	Cushion - Small	1
9	C218 3045	Guide Mylar	1
10	C218 3037	Flat Cable Cover	1
11	C218 2500	Scanner Upper Cover	1
12	C218 3171	Seal - 5x30	2
13	C218 3036	H.P Sensor Cover	1
14	C218 3034	H.P Sensor Bracket	1
15	C218 8407	Photointerruptor - GP1A34LC	1
16	C218 3205	Original Scale - A4	1
16	C218 3157	Original Scale - LT	1
17	C222 3170	Exposure Glass Sheet	1
18	C218 3166	Exposure Glass (A4)	1
18	C218 3154	Exposuer Glass (LT)	1
19	C218 3446	Magnet Catch Plate	2
20	C218 2525	Stepped Screw - M4	1
21	C217 5102	Spring Washer	1
22	C218 3018	Seal - 40x131	1
23	C218 2516	Decal - Original Scale - A4	1
23	C218 2820	Decal - Original Size - LT	1
24	C218 3044	Cover Cushion	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0344 0060D	Philips Truss Head Screw - M4x6	
101	0314 0060Z	Philips Pan Head Screw - M4x6	
102	0344 0060D	Philips Truss Head Screw - M4x6	
103	0960 4006Z	Philips Frang Screw - M4x6	
104	1105 0005	Nylon Clip - 3n	
105	0313 0060Z	Philips Pan Head Screw - M3x6	
106	1204 2353	Switch - PS3670-02	
107	0324 0060Z	Philips Sunken Head Screw - M4x6	

26. SCANNER SECTION 2 (C223)

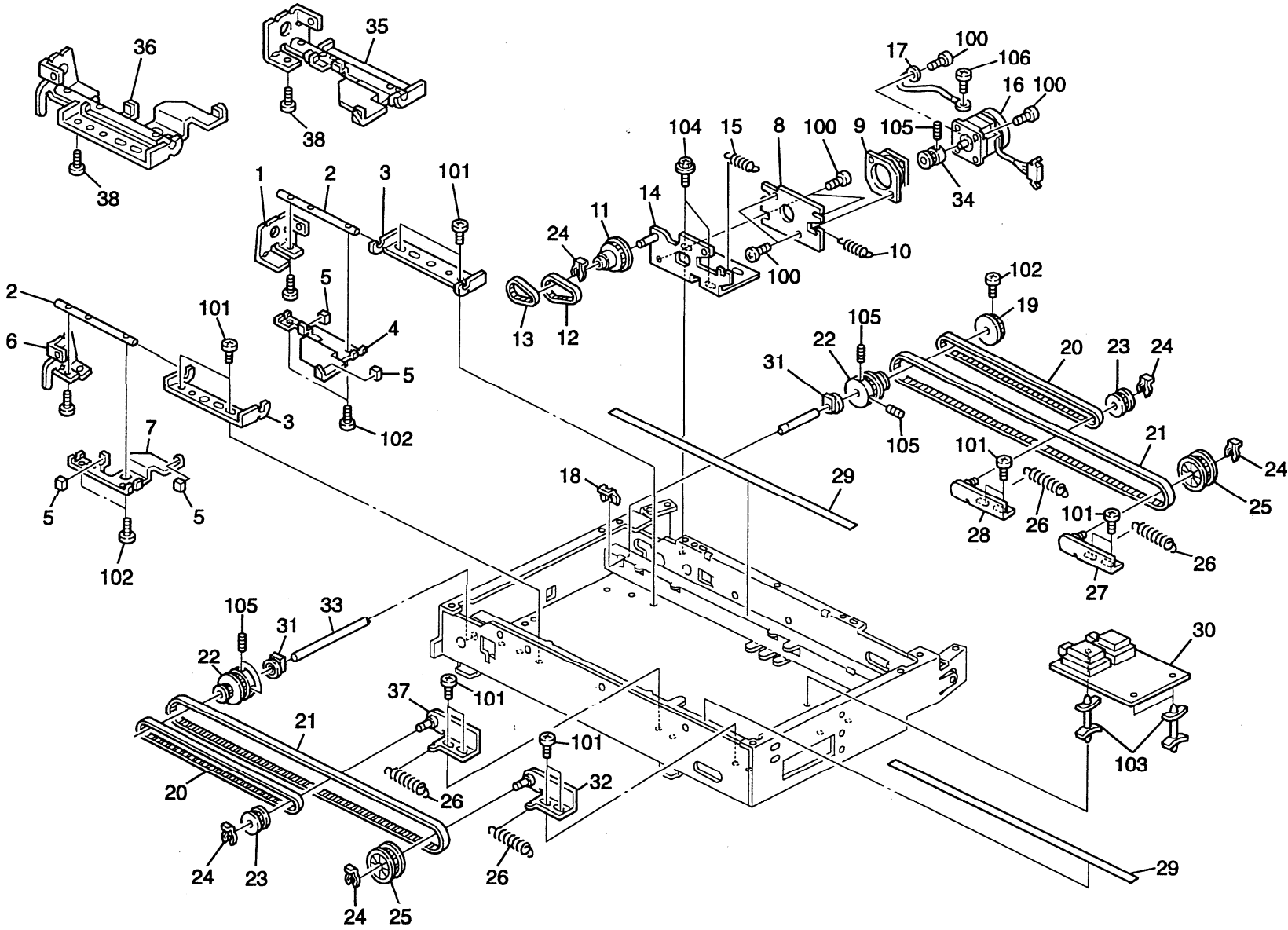


26. SCANNER SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C222 3185	Mirror Bracket - 2nd/3rd	1
2	C218 3206	2nd And 3rd Mirror	2
3	C218 3208	Front Spring Plate	2
4	C218 3207	Rear Spring Plate	2
5	C218 3193	Timing Belt Clamp	3
6	C222 3175	Scanner Slider	6
7	C218 8424	Original Sensor	1
8	C218 8132	Original Sensor Harness	1
9	C218 3039	Flat Cable Clamp	2
10	C222 3150	1st Mirror Bracket	1
11	C218 3191	1st Mirror	1
12	C218 3190	Spring Plate	2
13	C218 8153	Scanner Flat Cable	1
14	C222 3178	Fluorescent Lamp Harness Bracket	1
15	C218 3213	Adjusting Ball	3
16	C222 3200	Fluorescent Lamp Harness	1
17	C222 3169	Harness Bracket	1
18	C222 8220	Fluorescent Lamp	1
19	C218 3223	Adjusting Spring Plate	1
20	C218 3043	Lens Base Plate	1
21	C218 3226	Shading Plate	1
22	C223 3215	CCD Bracket	1
23	C218 3212	Adjusting Pin	4
24	C223 8072	CCD Board	1
25	C218 3225	Front Adjust Spring	1
26	C218 3214	Lens Bracket	1
27	C218 3211	Lens Holder	1
28	C218 3224	Rear Adjust Spring	1
29	AC02 0046	CCD Lens F4/43	1
30	C222 3232	CCD Board Cover	1
31	C222 8012	A/D Converter Board	1
32	C222 3120	Spacer	4
33	C222 3019	Scanner Harness Cover	1
34	C222 3179	Harness Clip	1
35	C222 3234	Grounding Plate (230V)	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	C223 3233	CCD Board Bracket	
100	0951 3006Z	Philips Screw With Flat Washer - M3	
101	0313 0060Z	Philips Pan Head Screw - M3x6	
102	0314 0060Z	Philips Pan Head Screw - M4x6	
103	0960 4006Z	Philips Frang Screw - M4x6	
104	0951 4008Z	Philips Screw With Flat Washer M4x8	
105	0801 1004	Screw - M4X4	
106	0965 3008W	Tapping Screw With Flat Washer - M3x8	
107	0701 0030Z	Flat Washer - M3	
108	1105 0005	Nylon Clip - 3n	
109	0965 3008W	Tapping Screw With Flat Washer-M3x8	

27. SCANNER SECTION 3 (C223)

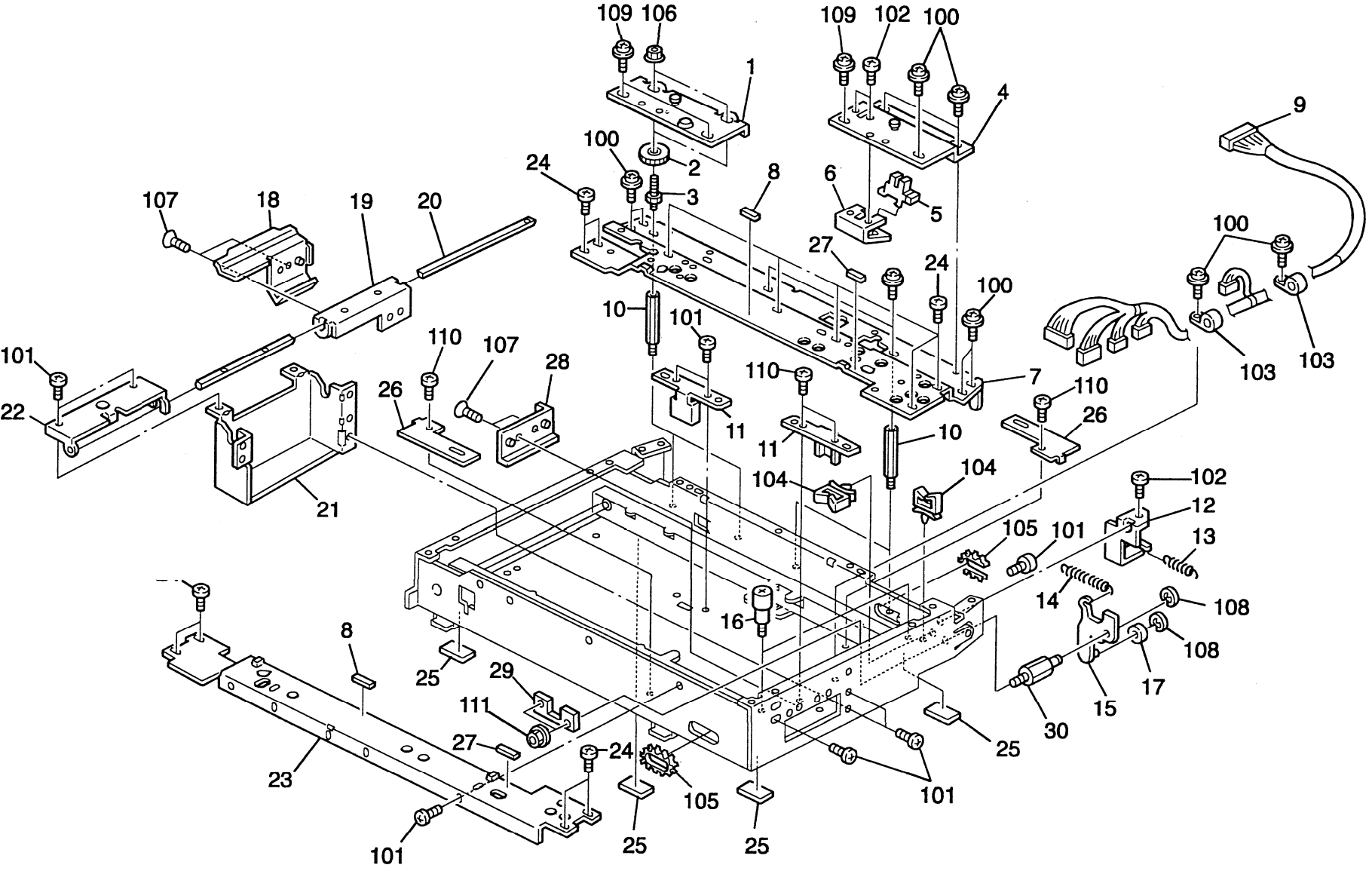


27. SCANNER SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 3060	Rear Fixed Angle	1
2	C218 3057	Fixed Shaft	2
3	C218 3056	Fixed Shaft Bracket	2
4	C218 3053	Arm - Carriage - Fix - Front	1
5	C218 3054	Pad - 5x5	4
6	C218 3055	Front Fixed Angle	1
7	C218 3059	Rear Fixed Arm	1
8	C218 3081	Tension Bracket	1
9	C218 3086	Motor Cushion	1
10	C218 3082	Tension Spring	1
11	C218 3065	Pulley - 22/56Z	1
12	C218 3072	Timing Belt - B40S2M160	1
13	C218 3073	Timing Belt - B60S2M126	1
14	C218 3078	Scanner Motor Bracket	1
15	C218 3083	Tension Spring	1
16	C223 8214	Stepping Motor	1
17	C218 8426	Grounding Harness	1
18	C209 3133	Retaining Ring - M6	1
19	C218 3066	Pulley - 49Z	1
20	C218 3075	Timing Belt - B40S2M800	2
21	C218 3074	Timing Belt - B40S2M1274	2
22	C218 3063	Scanner Drive Pulley	2
23	C218 3069	Timing Pulley - 24Z	2
24	5447 2681	Snap Ring	5
25	C218 3068	Timing Pulley - 48Z	2
26	C218 3094	Tension Spring	4
27	C218 3103	Timing Pulley Bracket - Rear 2	1
28	C218 3096	Timing Pulley Bracket - Rear 1	1
29	C218 3017	Scanner Grip Rail	2
30	C222 8221	Inverter	1
31	C222 3193	Bushing - 8mm	1
32	C218 3099	Timing Pulley Bracket - Front 2	1
33	C218 3090	Scanner Drive Shaft	1
34	C218 3062	Timing Pulley - Scanner Motor	1
35	C218 3053	Arm - Carriage - Fix - Front	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	C218 3059	Rear Fixed Arm	1
37	C218 3091	Timing Pulley Bracket - Front 1	1
38	C218 3051	Philips Screw - M3	1
100	0314 0080Z	Philips Screw - 4x8	
101	0801 1004	Screw - M4X4	
102	0313 0050Z	Philips Screw - 3x5	
103	1105 0225	Spacer - W Rocking	
104	0804 6074	Hexagon Bolt - M4x8	
105	0573 0040E	Hexagon Headless Set Screw - M3x4	
106	0964 4006Z	Tapping Screw W/Flat Washer - M4x6	

28. SCANNER SECTION 4 (C223)

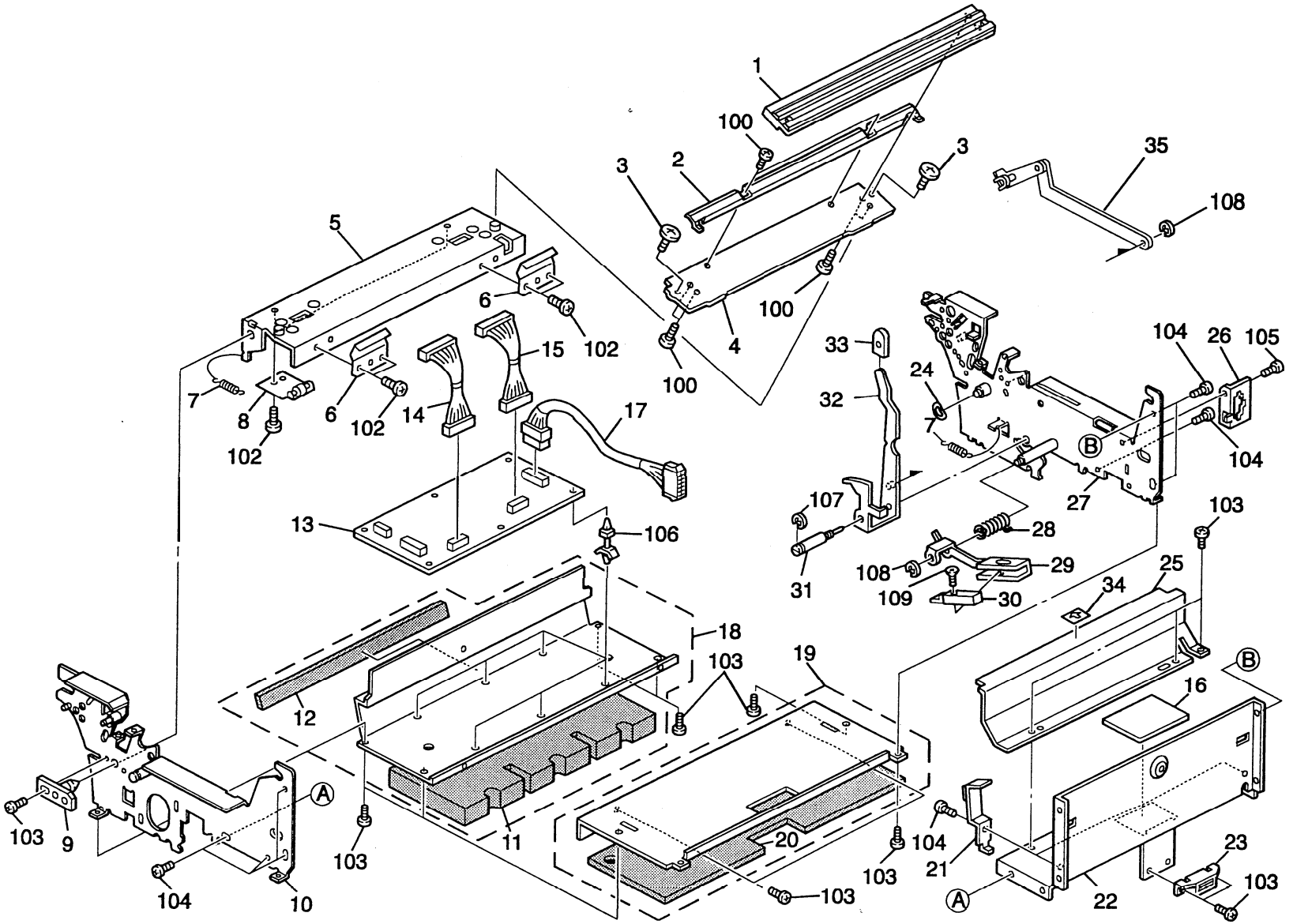


28. SCANNER SECTION 4 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 3438	Platen Cover Left Bracket	1
2	C218 3430	Knob Screw	2
3	C218 3431	Platen Cover Shaft	2
4	C218 3426	Platen Cover Right Bracket	1
5	AW02 0021	Photointerruptor - 175487-3	1
6	C218 3434	Sensor Bracket	1
7	C218 3028	Scanner Rear Stay	1
8	C218 3025	Contact Grass Cushion	2
9	C222 8415	Scanner Harness	1
10	C218 3031	Stud	4
11	C223 3014	Scanner Stopper Lever	2
12	C218 3118	Scanner Stopper Bracket	1
13	C218 3117	Stopper Spring 2	1
14	C218 3116	Stopper Spring 1	1
15	C218 3112	Scanner Stopper	1
16	C218 3020	Stopper Pin	2
17	C209 4087	Gide Plate Roller	1
18	C223 3108	Scanner Open Grip	1
19	C223 3109	Grip Bracket	1
20	C218 3111	Scanner Grip Shaft	1
21	C222 3016	Scanner Grip Cover	1
22	C218 3110	Scanner Grip Upper Cover	1
23	C218 3024	Scanner Front Stay	1
24	5875 2088	Shoulder Screw - M4	11
25	C218 3003	Seal - 28x40	4
26	C222 3235	Grounding Plate	2
27	C223 3024	Contact Glass Sheet	2
28	C223 3119	Scanner Open Cover	1
29	C218 3021	Support Plate	1
30	C218 3022	Scanner Stopper Shaft	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0960 4008Z	Flange Head Screw - 4 X 8	
101	0314 0060Z	Philips Pan Head Screw - M4x6	
102	0313 0060Z	Philips Pan Head Screw - M3x6	
103	1105 0011	Nylon Clip - 8n	
104	1105 0144	Harness Clamp	
105	1106 0103	Universal Bushing	
106	0713 0040B	Hexagon Nut - M4	
107	0324 0060Z	Philips Sunken Head Screw - M4x6	
108	0720 0030Z	Retaining Ring - M3	
109	0960 4008W	Philips Flange Screw - M4x8	
110	0801 1004	Screw - M4X4	
111	0713 0050B	Hexagon Nut - M5	

29. PLOTTER SECTION 1 (C223)

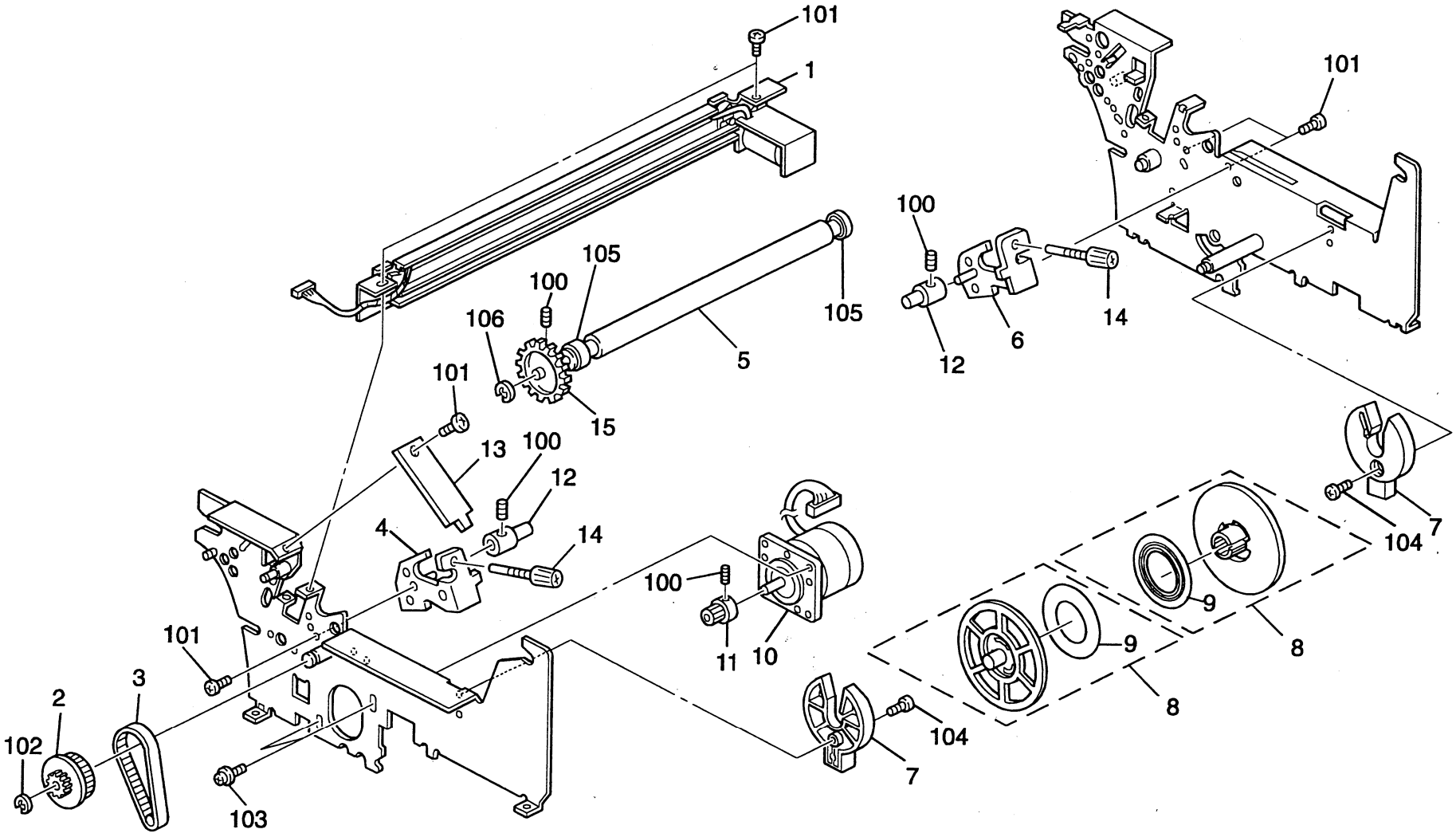


29. PLOTTER SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C223 8037	Thermal Head - A3	1
2	C223 4037	Thermal Head Guide Plate	1
3	C209 4180	Thermal Head Spacer	2
4	C223 4035	Spacer	1
5	C223 4030	Thermal Head Stay	1
6	C209 4139	Spring Plate	2
7	C223 4034	Spring	1
8	C218 4136	Spring Plate	1
9	C209 4040	Left Adjusting Plate	1
10	C223 4005	Plotter Left Side Plate	1
11	C223 2599	Plotter Base Pad - Large	1
12	C209 2585	Plotter Base Pad - Small	1
13	C222 8028	Thermal Head Drive Board	1
14	C222 8163	Thermal Head Harness - 2	1
15	C222 8164	Thermal Head Harness - 1	1
16	C219 4023	Seal	1
17	C219 8146	Harness Head Power	1
18	C223 4133	Plotter Base	1
19	C223 2586	Lower Plotter Cover	1
20	C223 2587	Plotter Cover Pad	1
21	C203 4013	Brake Plate	1
22	C209 4021	Holder - Master	1
23	5054 0536	Magnet Catch Ass'y	1
24	C218 4038	Bushing Washer - M8	1
25	C223 4054	Thermal Head Cover	1
26	C218 4126	Right Connector Bracket	1
27	C223 4010	Plotter Right Side Plate	1
28	C200 4116	Sensor Spring	1
29	C209 4027	Master End Sensor Bracket	1
30	5203 5230	Master Sensor	1
31	C209 4063	Lever Shaft	1
32	C218 4060	Platen Release Lever	1
33	C209 4059	Lever Knob	1
34	C218 2827	Decal - Master Feed	1
35	C209 4076	Tension Release Arm	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0313 0040Z	Philips Pan Head Screw - M3x4	
101	0313 0060Z	Philips Pan Head Screw - M3x6	
102	0313 0050Z	Philips Screw - 3x5	
103	0314 0060Z	Philips Pan Head Screw - M4x6	
104	0434 0080Z	Tapping Screw - M4x8	
105	0434 0060Z	Tapping Screw - M4x6	
106	1105 0193	Nylon Stud	
107	0720 0070Z	Retaining Ring - M7	
108	0720 0040Z	Retaining Ring - M4	
109	0323 0100Z	Philips Sunken Head Screw - M3x10	

30. PLOTTER SECTION 2 (C223)

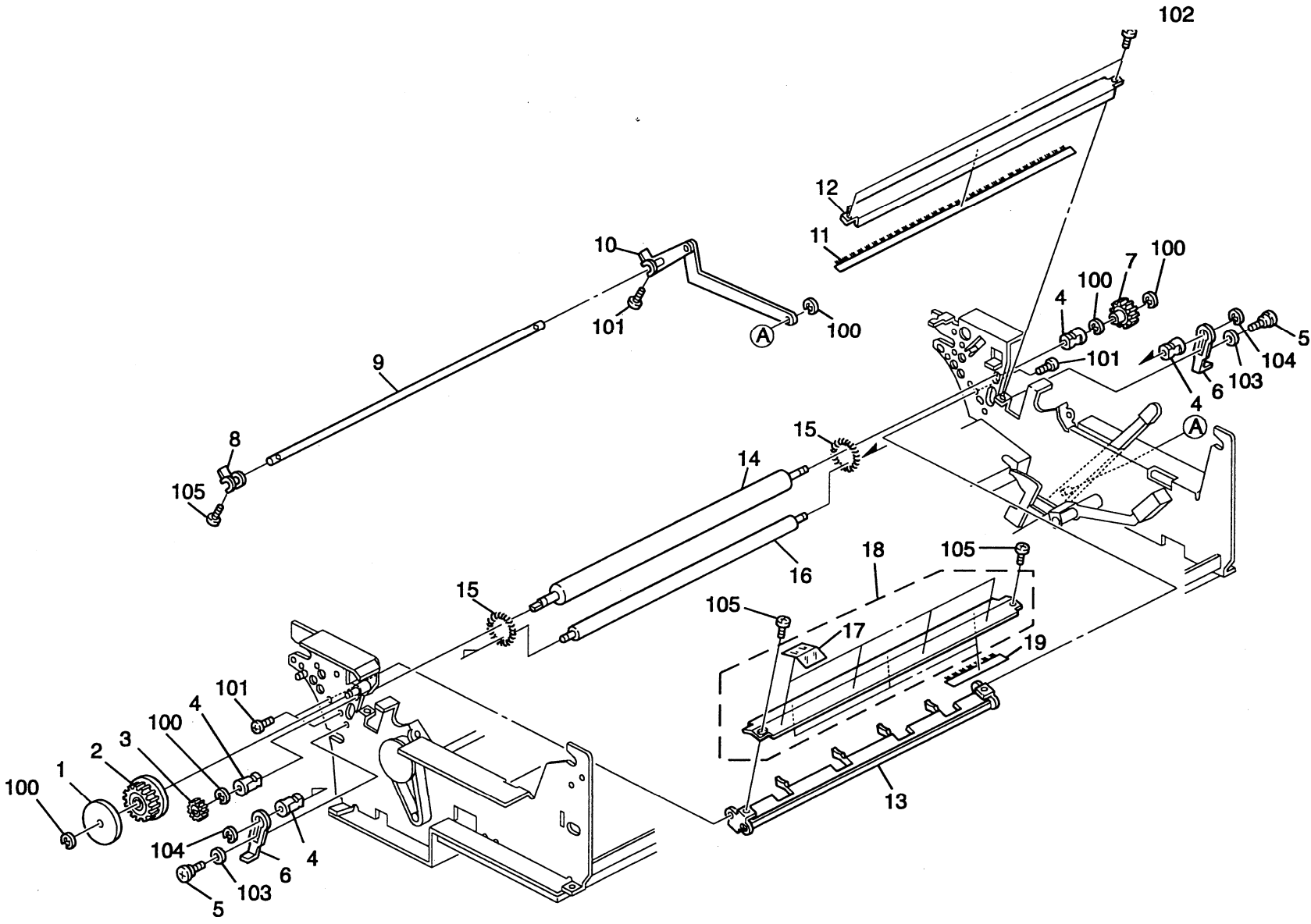


30. PLOTTER SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 4065	Cutter Unit	1
2	C223 4111	Pulley - 38	1
3	C223 4112	Timing Belt	1
4	C223 4179	Left Holder - Platen Cover	1
5	C223 4047	Platen Roller	1
6	C223 4184	Right Holder - Platen Cover	1
7	C209 4025	Master Roller Holder	2
8	C218 4230	Master Flange	2
9	C218 2507	Decal - Master Flange	2
10	C222 8216	Stepper Motor - DC2.85V 4.28W	1
11	C219 4071	Gear - 17Z	1
12	C223 4175	Thermal Head Positioning Pin	2
13	C221 4070	Gear Cover	1
14	C207 4150	Fixing Screw	2
15	C209 4049	Gear - 48Z	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0574 0040E	Hexagon Headless Set Screw - M4x4	
101	0314 0060Z	Philips Pan Head Screw - M4x6	
102	0720 0080Z	Retaining Ring - M8	
103	0951 4010Z	Philips Screw With Flat Washer M4 X	
104	0434 0080Z	Tapping Screw - M4x8	
105	0740 3008	Ball Bearing - 8x22x7	
106	0720 0060Z	Retaining Ring - M6	

31. PLOTTER SECTION 3 (C223)

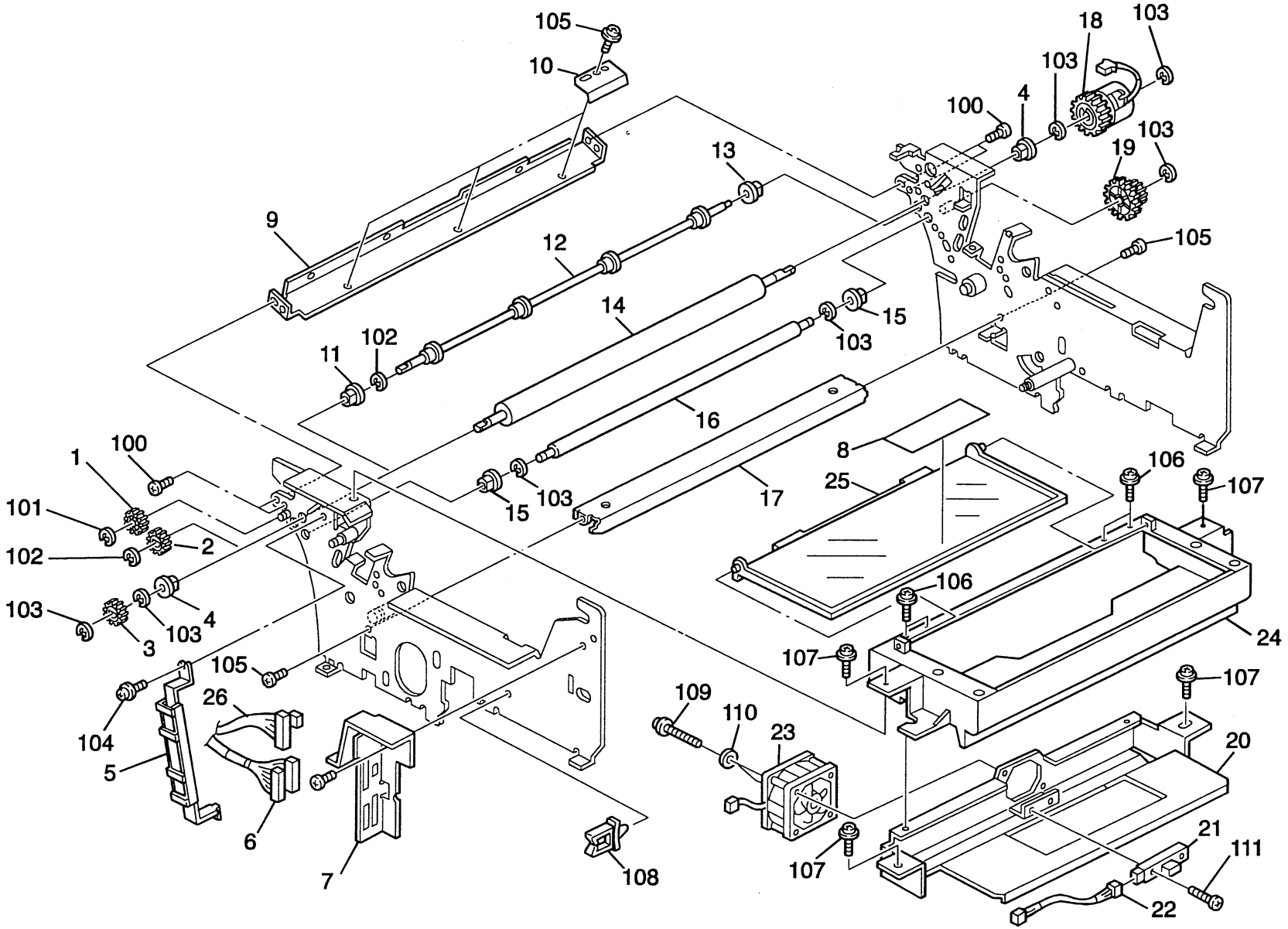


31. PLOTTER SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 4116	Spacer - 6x36x0.3	1
2	C209 4115	Gear - 30Z	1
3	C209 4071	Gear -25Z	1
4	5056 0188	Bushing - 6mm - Long	4
5	5403 2075	Stepped Screw	2
6	C203 4060	Tension Release Slider	1
7	C209 4072	Gear - 24Z	1
8	C209 4075	Left Arm - Tension Release	1
9	C209 4082	Tension Release Shaft	1
10	C209 4076	Tension Release Arm	1
11	C209 4320	Antistatic Brush	1
12	C223 4068	Front Guide Plate	1
13	C209 4093	Reverse Guide	1
14	C209 4070	Upper Master Feed Roller	1
15	C200 4184	Tension Spring	2
16	C209 4074	Lower Master Feed Roller	1
17	C223 4038	Master Guide - Large	4
18	C223 4088	Lower Guide Plate	1
19	C209 4321	Antistatic Brush	3

Index No.	Part No.	Description	Q'ty Per Assembly
100	0720 0040Z	Retaining Ring - M4	
101	0313 0060Z	Philips Pan Head Screw - M3x6	
102	0312 5050Z	Philips Pan Head Screw - M2.5x5	
103	0701 0060Z	Flat Washer - M6	
104	0720 0050Z	Retaining Ring - M5	
105	0313 0050Z	Philips Screw - 3x5	

32. PLOTTER SECTION 4 (C223)

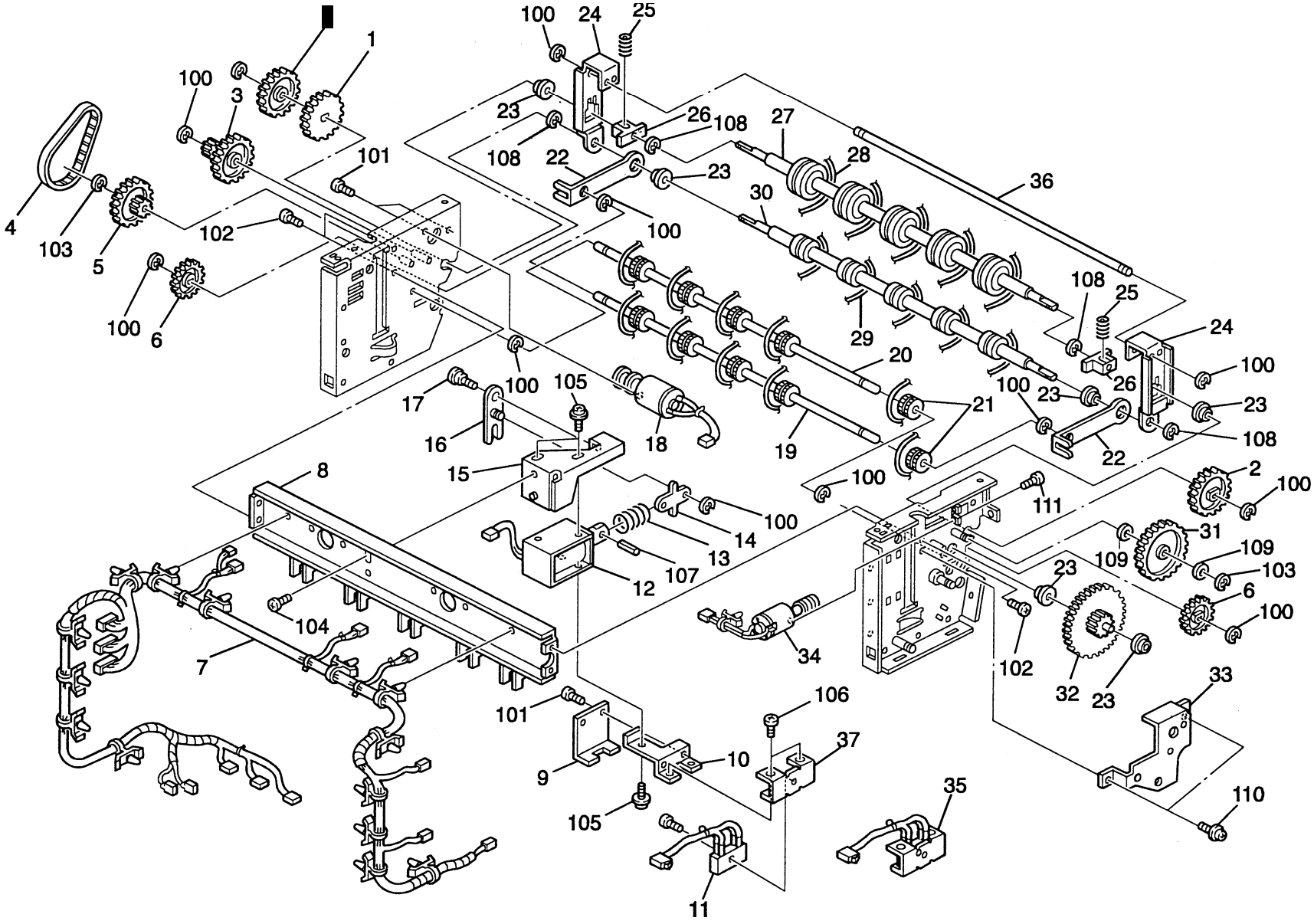


32. PLOTTER SECTION 4 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C200 2338	Gear - 20T	1
2	C209 4305	Gear - 16Z	1
3	C209 4303	Gear -27Z	1
4	H012 1181	Bushing- 6mm	2
5	C209 4128	Harness Bracket	1
6	C222 8128	Thermal Head Harness	1
7	C223 4125	Left Connector Bracket	1
8	C222 2553	Caution Decal - Master Set	1
9	C223 4306	Invertor Guide Stay	1
10	C209 4307	Reverse Guide Plate	3
11	5324 1658	Bushing- 4x8x4.5mm	1
12	C209 4300	Counter Roller	1
13	H002 2226	Bushing	1
14	C209 4100	Upper Reverse Roller	1
15	H012 1181	Bushing- 6mm	2
16	C209 4105	Lower Reverse Roller	1
17	C209 4019	Plotter Middle Stay	1
18	C209 8239	Reverse Roller - Magnetic Clutch	1
19	C209 4114	Gear - 20/27Z	1
20	C223 4331	Duct Suppor Plate	1
21	C203 8137	Master Sensor	1
22	C222 8129	Sensor Relay Harness	1
23	C222 8208	Air Knife Motor	1
24	C223 4328	Duct Stay	1
25	C222 4336	Duct Cover	1
26	C222 8160	Thermal Head Drive Harness	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0313 0060Z	Philips Pan Head Screw - M3x6	
101	0720 0020Z	Retaining Ring - M2	
102	0720 0025Z	Retaining Ring - M2.5	
103	0720 0040Z	Retaining Ring - M4	
104	0964 4008Z	Tapping Screw W/washer - M4x8	
105	0313 0050Z	Philips Screw - 3x5	
106	0951 3008Z	Philips Screw With Flat Washer - M3	
107	0951 4006Z	Philips Screw With Flat Washer - M4	
108	1105 0144	Harness Clamp	
109	0313 0350Z	Pan Head Screw - M3x35	
110	0701 0030Z	Flat Washer - M3	
111	0313 0080Z	Philips Screw - 3x8	

33. MASTER EJECT SECTION 1 (C223)

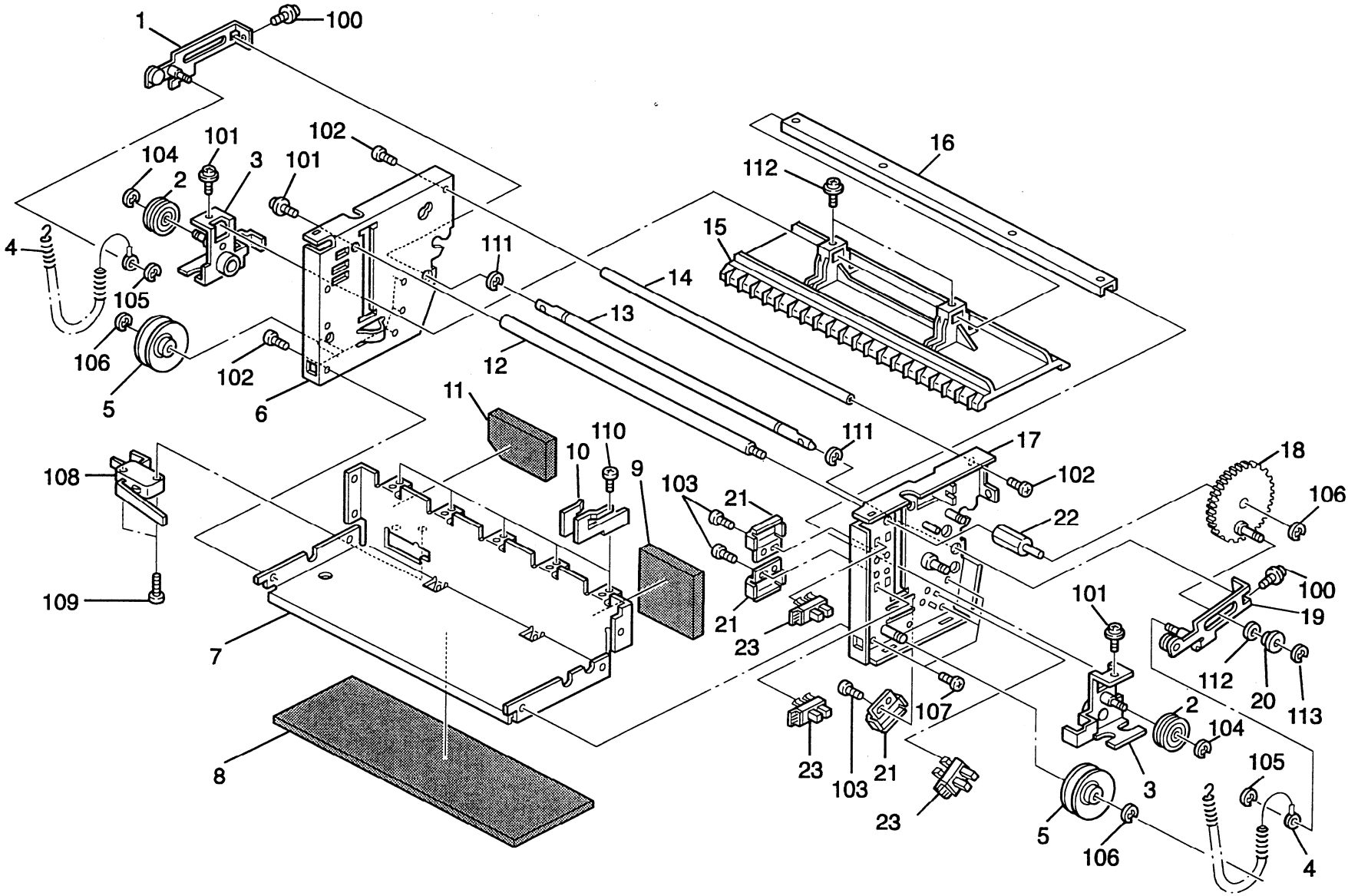


33. MASTER EJECT SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 3545	Gear - 62Z	1
2	C200 3627	Gear - 30T	2
3	C200 3606	Coupled Gear - 62T & 20T	1
4	C207 3612	Timing Belt - B30S2M126	1
5	C207 3604	Pulley - 40Z	1
6	C200 3628	Gear - 20T	2
7	C223 8122	Master Exit Harness	1
8	C209 3516	Master Eject Stay	1
9	C209 3530	Sensor Cover - Master Eject	1
10	C209 3529	Sensor Bracket - Master Eject	1
11	C209 8117	Drum Master Detection Sensor	1
12	C209 8269	Master Eject Solenoid	1
13	C207 6125	Guide Plate Spring	1
14	C209 3661	Solenoid Plate	1
15	C200 3553	Solenoid Bracket	1
16	C200 3554	Solenoid Arm	1
17	5403 2075	Stepped Screw	1
18	C209 8260	Micro Motor - Master Eject	1
19	C201 3529	Lower Pulley Shaft	1
20	C207 3530	Upper Pulley Shaft	1
21	C200 3547	Pulley	10
22	C200 3529	Pulley Plate	2
23	5506 4608	Bushing - Paper Hold/down Roller -	6
24	C221 3519	Roller Arm	2
25	C201 3527	Pressure Spring	2
26	C209 3520	Separation Roller Bushing	2
27	C209 3522	1st Upper Eject Roller	1
28	C219 3545	Upper Belt	5
29	C219 3546	Lower Belt	5
30	C209 3524	1st Lower Eject Roller	1
31	C209 3550	Worm Gear - 16/50Z	1
32	C209 3551	Gear - 16/116Z	1
33	C209 3557	Bracket	1
34	C217 8447	DC Motor - 24V/7.2W	1
35	C209 3561	Master Eject Sensor	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	C209 3521	Arm Connecting Shaft	1
37	C213 3561	Master Eject Sensor Bracket	1
100	0720 0040Z	Retaining Ring - M4	
101	0313 0030Z	Philips Pan Head Screw - M3x3	
102	0434 0060Z	Tapping Screw - M4x6	
103	0720 0030Z	Retaining Ring - M3	
104	0314 0050Z	Philips Pan Head Screw - M4x5	
105	0951 3006Z	Philips Screw With Flat Washer - M3	
106	0313 0050Z	Philips Pan Head Screw - M3x5	
107	0623 0120E	Spring Pin - M3x12	
108	0720 0050Z	Retaining Ring - M5	
109	0807 3041	Spring Washer	
110	0964 4008Z	Tapping Screw W/washer - M4x8	
111	0313 0030Z	Philips Pan Head Screw - M3x3	

34. MASTER EJECT SECTION 2 (C223)

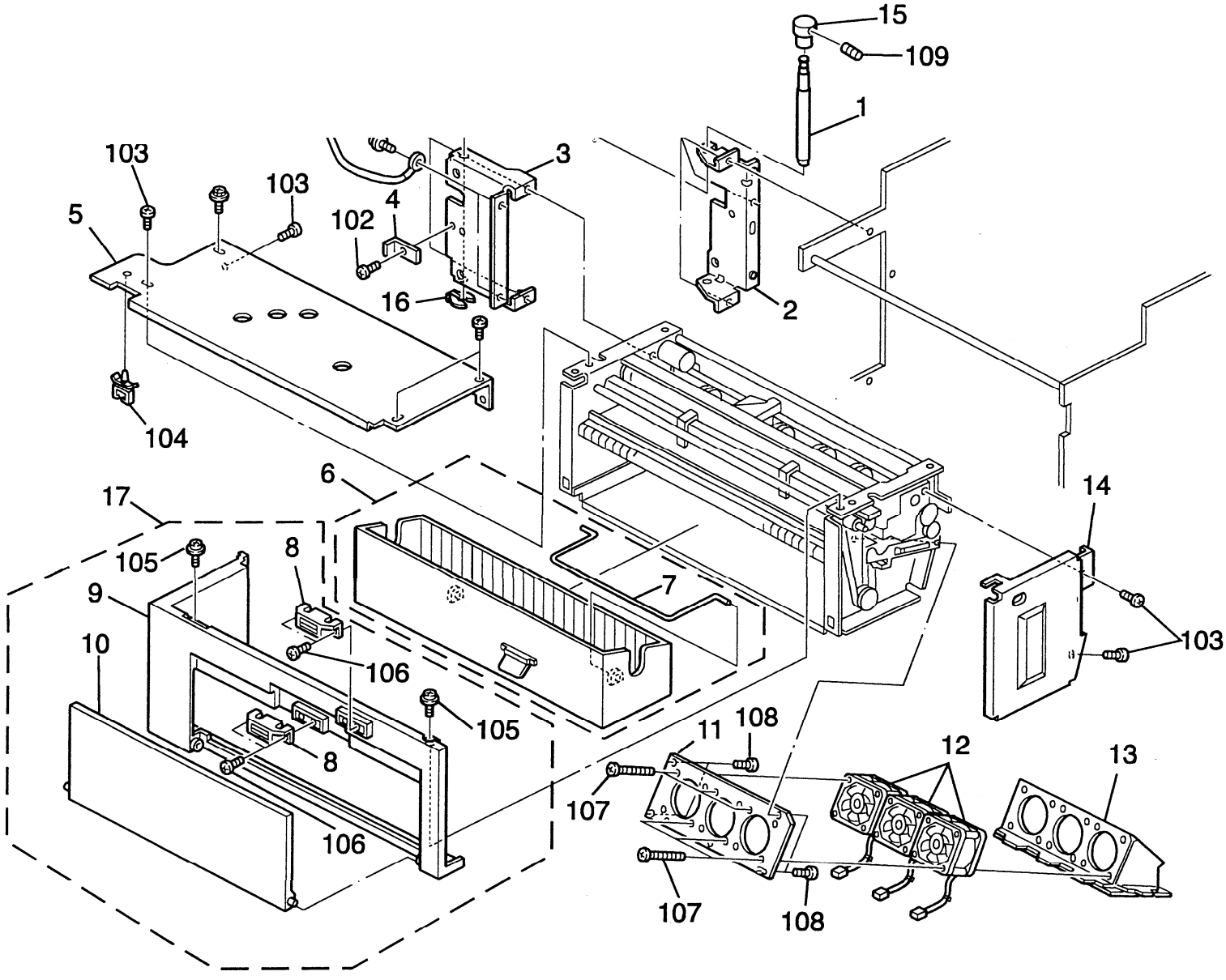


34. MASTER EJECT SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 3543	Rear Pressure Arm	1
2	C209 3536	Pulley	2
3	C209 3533	Plessure Plate Arm	2
4	C221 3537	Pressure Spring	2
5	C200 3712	Pulley	2
6	C209 3512	Rear Side Plate	1
7	C209 3526	Bottom Plate - Master Eject Box	1
8	C209 2579	Lower Pad - Master Eject Box	1
9	C209 2581	Left Pad - Master Eject Box	1
10	C218 3532	Pulley Guide	5
11	C209 2580	Right Pad - Master Eject Box	1
12	C209 3642	Master Eject Stay - Large	1
13	C209 3539	Pressure Arm Shaft	1
14	C200 3508	Master Eject Stay - Small	1
15	C209 3531	Pressure Plate	1
16	C209 3532	Pressure Plate Shaft	1
17	C209 3501	Front Side Plate	1
18	C209 3554	Gear - 60Z	1
19	C209 3540	Front Pressure Arm	1
20	C209 3615	Spacer - 6x12x3	1
21	C209 3507	Master Eject Sensor Cover	3
22	C209 3643	Lock Stay	1
23	AW02 0075	Photointerrupter	3

Index No.	Part No.	Description	Q'ty Per Assembly
100	0960 4010Z	Philips Flange Screw - M4x10	
101	0960 4005Z	Philips Flange Screw - M4x5	
102	0314 0080Z	Philips Screw - 4x8	
103	0433 0060W	Tapping Screw - M3x6	
104	0720 0040Z	Retaining Ring - M4	
105	0720 0030Z	Retaining Ring - M3	
106	0720 0060Z	Retaining Ring - M6	
107	0434 0060Z	Tapping Screw - M4x6	
108	1204 1490	Micro Switch - V-53-1A3	
109	0313 0140Z	Philips Pan Head Screw - M3x14	
110	0314 0060Z	Philips Pan Head Screw - M4x6	
111	0720 0080Z	Retaining Ring - M8	
112	0807 4118	Flat Washer	
113	0720 0050Z	Retaining Ring - M5	

35. MASTER EJECT SECTION 3 (C223)

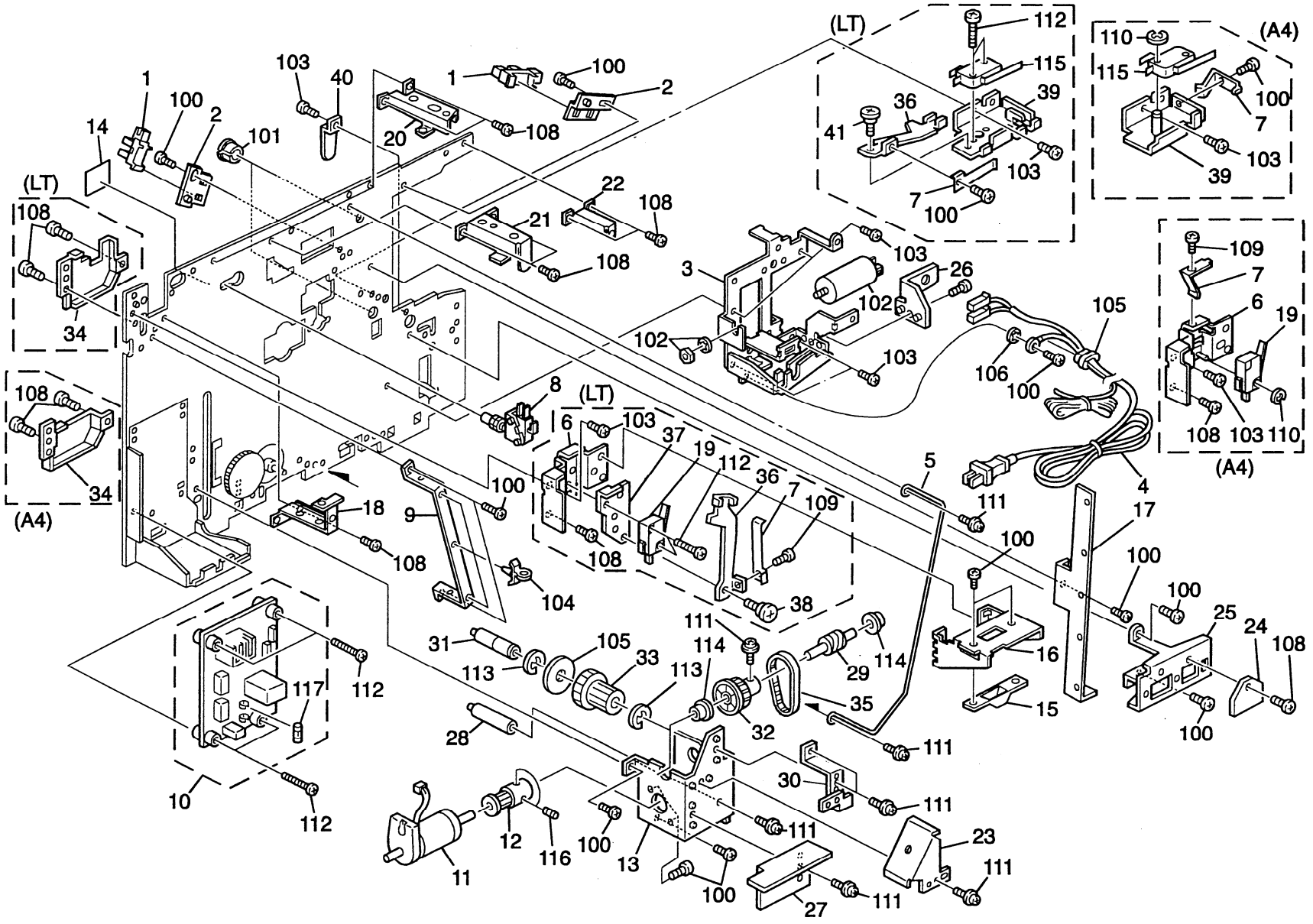


35. MASTER EJECT SECTION 3 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 3505	Hinge Shaft	1
2	C209 3671	Master Eject Hinge	1
3	C219 3680	Master Eject Hinge - Small	1
4	C209 3675	Cover Bracket	1
5	C219 3768	Upper Inner Cover	1
6	C209 3558	Master Eject Box	1
7	C203 3511	Arm - MasterEject Box	1
8	AG07 0004	Magnetic Catch	2
9	C218 2460	Master Eject Cover	1
10	C218 2456	Master Eject Cover	1
11	C209 3574	Blower Fan Bracket	1
12	C222 8208	Air Knife Motor	1
13	C209 3571	Blower Duct	1
14	C219 3673	Inner Cover - Master Eject	1
15	C218 3506	Boss	1
16	C209 3133	Retaining Ring - M6	1
17	C219 2454	Master Eject Cover	1
18	C203 8204	Grounding Wire	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0434 0080Z	Tapping Screw - M4x8	
101	0964 4010Z	Tapping Screw W/washer - M4x10	
102	0314 0080Z	Philips Screw - 4x8	
103	0434 0060Z	Tapping Screw - M4x6	
104	1105 0108	Nylon Clip	
105	0965 3006Z	Tapping Screw With Flat Washer-M3x6	
106	0434 0062W	Pan Head Tapping Screw - M4x6	
107	0313 0350Z	Pan Head Screw - M3x35	
108	0314 0060Z	Philips Pan Head Screw - M4x6	
109	0574 0040E	Hexagon Headless Set Screw - M4x4	

36. ELECTRICAL SECTION 1 (C223)

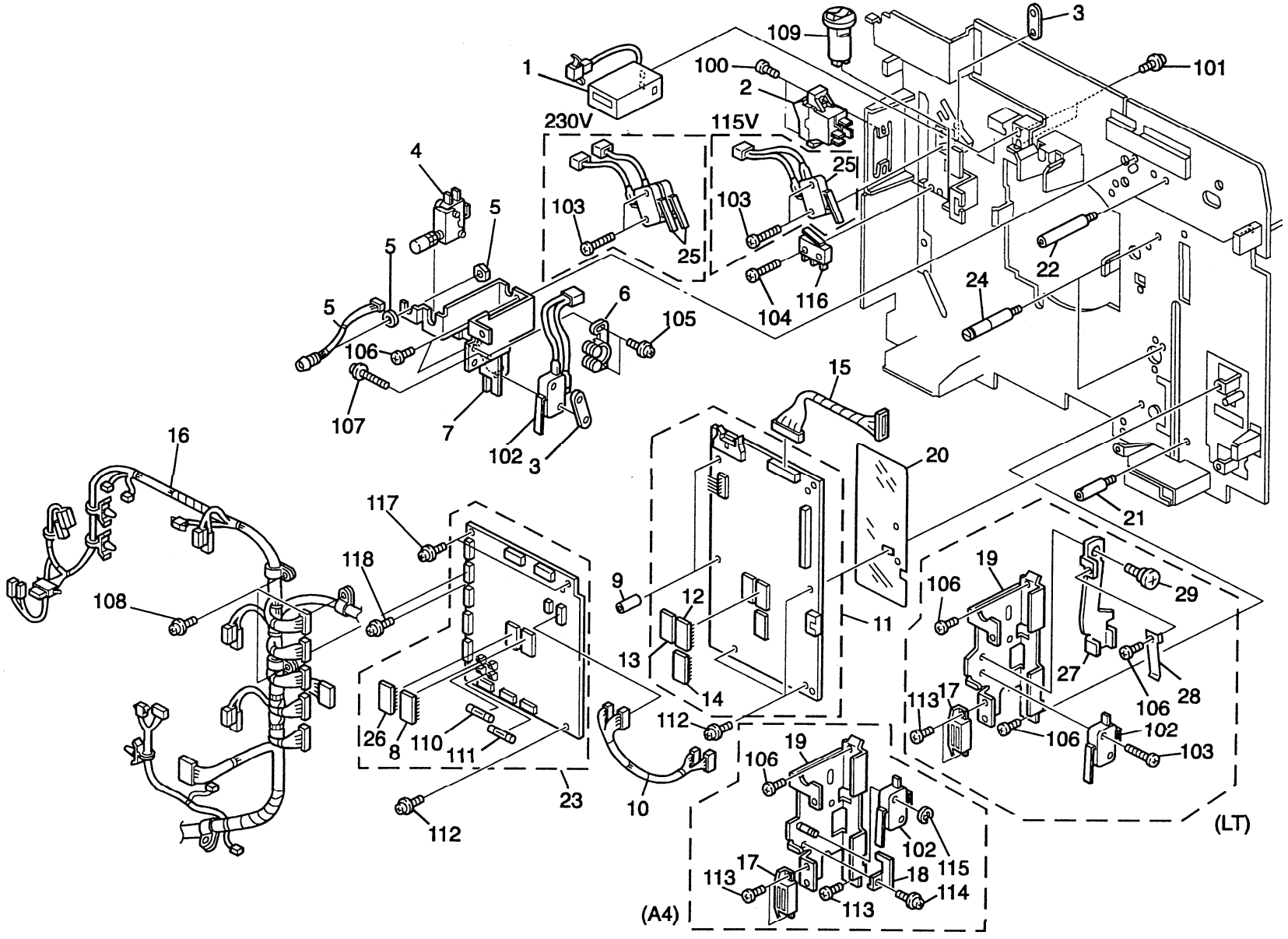


36. ELECTRICAL SECTION 1 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AW02 0021	Photointerruptor - 175487-3	2
2	C209 2306	Drum Sensor Bracket	2
3	C219 2104	Right Grip - Master Eject	1
4	C218 8242	Power Supply Cord - 115V	1
4	C218 8252	Power Supply Cord - 230V	1
5	C203 8095	Upper Harness Supporter	1
6	C221 2004	Switch Bracket (A4)	1
6	C218 2070	Safety Switch Bracket - LT	1
7	C200 3123	Support Plate - Safety Switch (A4)	1
7	C218 2173	Support Plate - Safety Switch - LT	1
8	C219 8174	Microswitch	1
9	C209 2169	Harness Bracket	1
10	C223 8058	AC Drive Board - 120V	1
10	C223 8064	AC Drive Board - 230V	1
11	C223 8213	DC Motor	1
12	C223 5097	Worm Wheel	1
13	C223 5093	Lift Motor Bracket	1
14	C203 2759	Master Cutter Decal	1
15	C222 2020	Scanner Stopper	1
16	C218 2015	Rear Scanner Stopper Bracket	1
17	C209 2130	Safety Cover	1
18	C218 2022	Rear Cover Left Bracket	1
19	C219 8296	Safety Switch	1
20	C218 2014	Rear Left Upper Bracket	1
21	C218 2013	Rear Center Upper Bracket	1
22	C218 2012	Rear Right Upper Bracket	1
23	C223 5092	Lifting Gear Cover	1
24	C221 2124	Cap	1
25	C221 2128	Support Bracket	1
26	C221 6115	Delivery Table Bracket	1
27	C223 5090	Motor Bracket	1
28	C223 5091	Gear Shaft	1
29	C223 5095	Worm Wheel	1
30	C223 5098	Support Gear Bracket	1
31	C223 5099	Worm Gear Shaft	1

Index No.	Part No.	Description	Q'ty Per Assembly
32	C223 5126	Timing Pulley	1
33	AB03 0216	Pulley - 15Z	1
34	C221 2028	Switch Cover Bracket	1
34	C218 2072	Safety Switch Cover - LT	1
35	C218 3073	Timing Belt - B60S2M126	1
36	C218 2172	Safety Switch Lever - LT	2
37	C218 2071	Safety Swtich Stopper - LT	1
38	C201 5125	Shoulder Screw - M4	1
39	C218 2171	Safety Switch Bracket - Eject Box (115V)	1
39	C210 2171	Safety Switch Bracket - Eject Box (230V)	1
40	C203 2128	AC Drive Board Cover	1
41	C217 4426	Shoulder Screw	1
100	0314 0080Z	Philips Screw - 4x8	
101	1106 0430	Bushing - 13mm	
102	1602 0991	Noise Filter - 115V	
102	1607 0742	Noise Filter - 230V	
103	0434 0080Z	Tapping Screw - M4x8	
104	1105 0046	Harness	
105	0807 7064	Spacer	
106	0705 0040B	Toothed Washer	
108	0314 0060Z	Philips Pan Head Screw - M4x6	
109	0313 0060Z	Philips Pan Head Screw - M3x6	
110	0720 0020Z	Retaining Ring - M2	
111	0960 4008Z	Flange Head Screw - 4 X 8	
112	0314 0160Z	Philips Pan Head Screw - M4x16	
113	0720 0120Z	Retaining Ring - M12	
114	0741 3706	Ball Bearing - 6x10x3	
115	1204 41442	Microswitch	
116	0574 0040E	Hexagon Headless Set Screw - M4x4	
117	1107 0354	Fuse - 3.15A 125V	

37. ELECTRICAL SECTION 2 (C223)

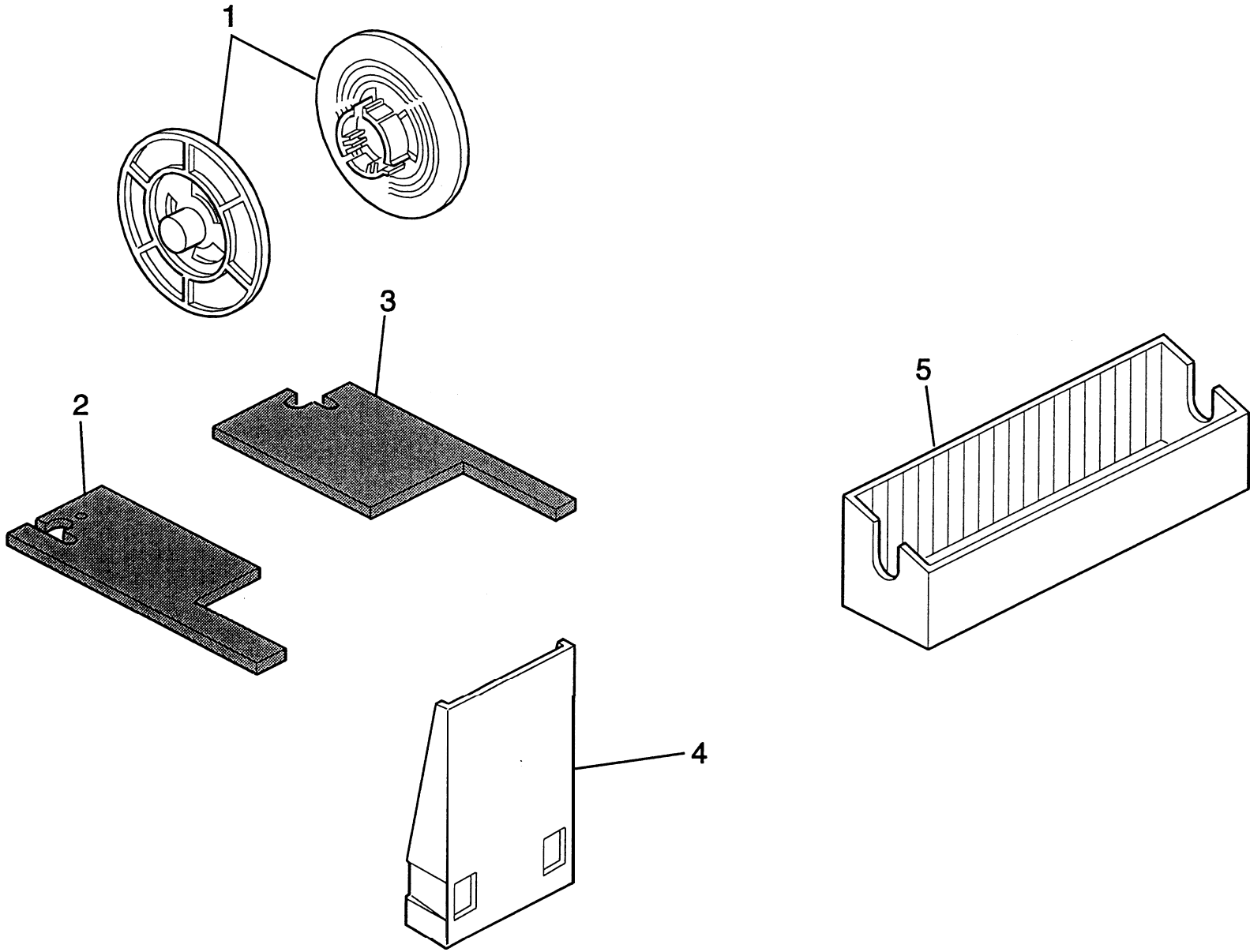


37. ELECTRICAL SECTION 2 (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C200 8446	Copy Counter	1
2	C209 8276	Main Switch	1
3	5056 0509	Nut Plate - Microswitch	2
4	C219 8171	Microswitch	1
5	C209 8278	LED - Drum	1
6	C209 2469	Door Catch	1
7	C219 2418	Push Switch Bracket	1
8	C223 8045	UVEPROM 512KX8 150NS	1
9	C218 2051	Main Board Spacer	2
10	C222 8127	Plotter Unit Harness	1
11	C223 8016	Image Processing Board	1
12	C223 8005	UVEPROM 256K X8 150NS	1
13	C223 8006	UVEPROM 256K X8 150NS	1
14	C223 8004	UVEPROM 256K X8 150NS	1
15	C222 8157	Thermal Head Harness	1
16	C223 8208	DC Drive Harness (230V)	1
16	C223 8111	DC Drive Harness (115V)	1
17	AG07 0004	Magnetic Catch	1
18	C200 3755	Plate Spring	1
19	C219 2419	Safety Switch Bracket	1
20	C218 5094	Insulating Sheet	1
21	C200 2596	Maim Board Stud - Long	1
22	C218 2052	Stud - Main Control Board	1
23	C223 8042	Main Control Board	1
24	C223 2054	IPU Board Stud	2
25	C219 8296	Safety Switch	1
26	C223 8047	UVEPROM 512K X8 150NS	1
27	C218 2172	Safety Switch Lever - LT	1
28	C218 2173	Support Plate - Safety Switch - LT	1
29	C218 2185	Stepper Screw	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0313 0060Z	Philips Pan Head Screw - M3x6	
101	0951 3004Z	Philips Screw With Flat Washer-M3x4	
102	1204 1490	Micro Switch - V-53-1A3	
103	0313 0140Z	Philips Pan Head Screw - M3x14	
104	0800 0084	Philips Pan Head Screw - M2.3x12	
105	0951 3012Z	Philips Screw W/h Flat Washer-M3x12	
106	0434 0080Z	Tapping Screw - M4x8	
107	0960 4010Z	Philips Flange Screw - M4x10	
108	0960 4008Z	Flange Head Screw - 4 X 8	
109	1107 0788	Circuit Breaker - 6A	
109	1107 0782	Circuit Breaker - 5A	
110	1107 0411	Fuse - 2A 125V	
111	1107 0415	Fuse 5A	
112	0951 3006Z	Philips Screw With Flat Washer - M3	
113	0314 0080Z	Philips Screw - 4x8	
114	0960 3006B	Philips Flange Screw - M3 X 6	
115	0720 0020Z	Retaining Ring - M2	
116	1204 2267	Micro Switch - V-162-3C25	
117	0951 3008Z	Philips Screw With Flat Washer - M3	

38. ACCESSORIES AND SPECIAL TOOLS (C223)

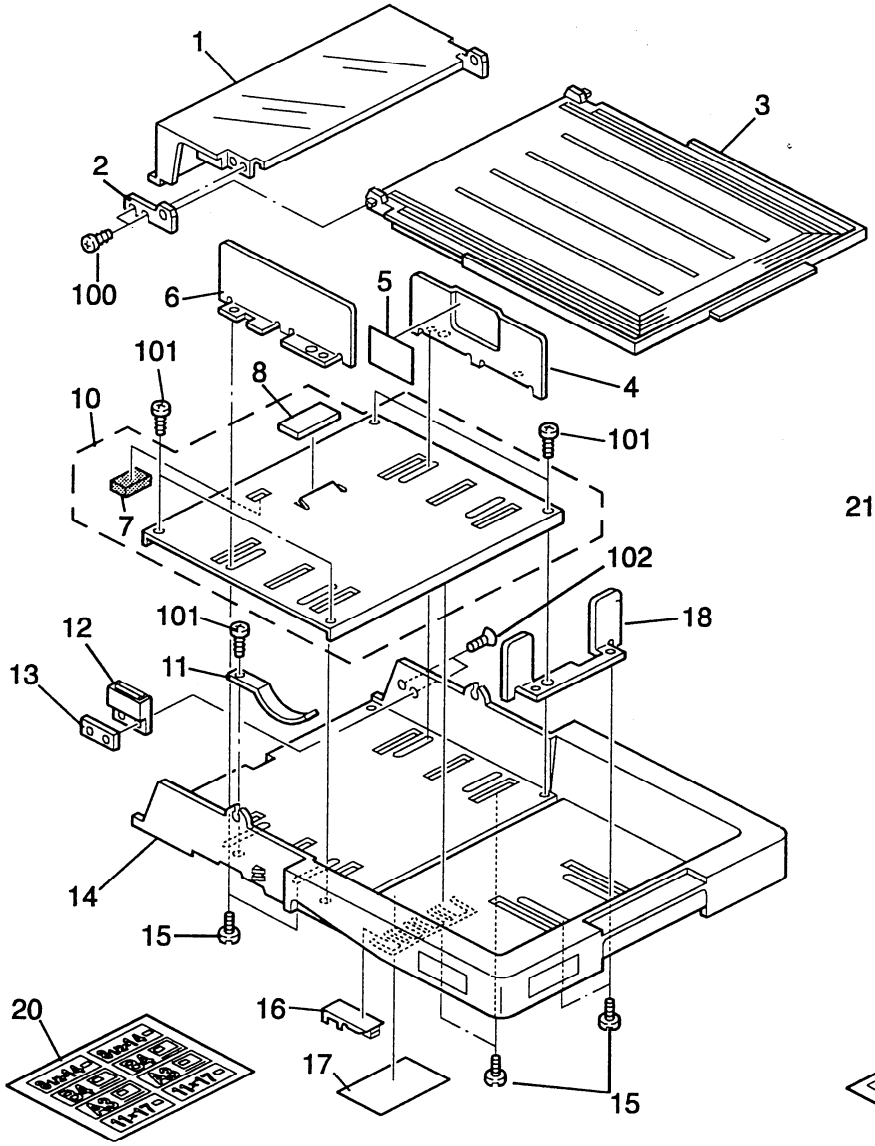


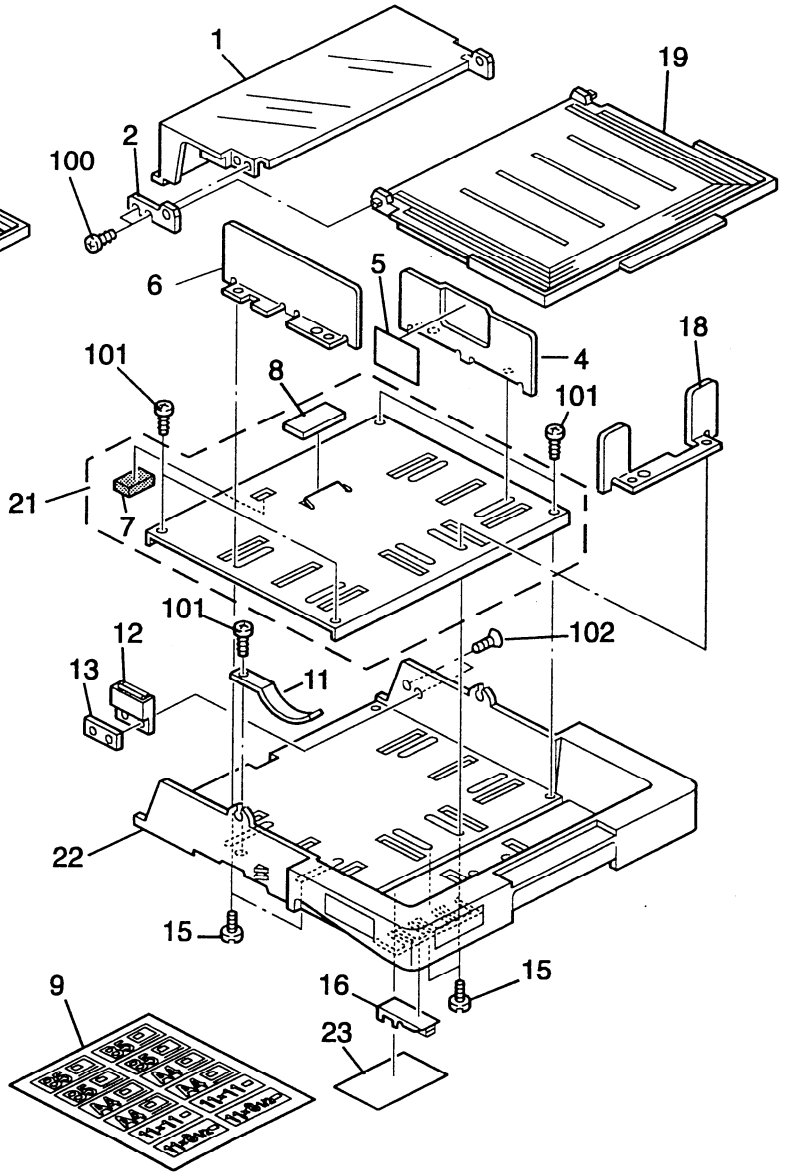
38. ACCESSORISE ANDSPECIAL TOOLS (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C218 4230	Master Flange	1
2	C223 2551	Base Pad - Front	1
3	C223 2553	Base Pad - Rear	1
4	C223 6183	End Plate	1
5	C209 3558	Master Eject Box	1

Index No.	Part No.	Description	Q'ty Per Assembly

39. CASSETTE (C223)





39. CASSETTE (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C209 5152	Cover Stopper - Large	1
2	C522 2417	Cover Stopper Supporter	1
3	C530 5012	Cassette Cover - Large	1
4	C209 5175	Side Frame	1
5	AA00 2010	Decal - Paper Level	1
6	C522 2431	Side Fence	1
7	C522 2423	Cushion Seal - 10x19	1
8	5507 6828	Rubber Plate - Feed Table	1
9	C218 5181	Decal - Paper Size - Small	1
10	C209 5155	Bottom Plate - Large	1
11	C522 2434	Grounding Plate	1
12	C200 3053	Magnet Catch	1
13	C522 2433	Plate Nut	1
14	C218 5151	Cassette Body - Large	1
15	C522 2435	Screw - M3	6
16	C218 5171	Magnet Holder	1
17	C218 5182	Decal - Magnet - Large	1
18	C522 2432	Rear Fence	1
19	5290 5012	Cassette Cover - Small	1
20	C218 5180	Decal - Paper Size - Large	1
21	C209 5162	Bottom Plate - Small	1
22	C218 5164	Cassette Body - Small	1
23	C218 5183	Decal - Magnet - Small	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0433 0082Z	Tapping Screw - M3x8	
101	0413 0052Z	Tapping Screw - M3x5	
102	0323 0060Z	Philips Sunk Screw - M3x6	

40. MAIN CONTROL BOARD (C223)

CAPACITOR

SYMBOL NO.	INDEX NO.
C101	216
C102	169
C103	164
C1(M	217
C105	216
C106	216
C107	169
C108	213
C109	164
C110	216

SYMBOL NO.	INDEX NO.
C111	218
C112	218
C113	164
C114	170
C115	215
C116	166
C117	213
C118	215
C119	212
C120	212

SYMBOL NO.	INDEX NO.
C121	212
C122	212
C123	214
CI24	216
C125	216
C126	169
C127	167
C128	167
C129	169
C130	216

SYMBOL NO.	INDEX NO.
C131	168
C132	168
C133	168
C134	168
C135	216
C136	216
C137	216
C138	216
C139	216
C140)	216

SYMBOL NO.	INDEX NO.
C141	216
C142	215
C143	216
C144	215
C145	216
C146	217
C147	216
C148	165
C149	165
C150	216

SYMBOL NO.	INDEX NO.
C151	**216**
C152	**218**
C153	**216**
C154	**215**
C155	**216**
C156	**216**
C157	**216**
C158	**216**
C159	**216**
C160	**216**

SYMBOL NO.	INDEX NO.
C161	216
C162	216
C163	216
C164	215
C165	216
C166	216
C167	216
C168	216
C169	219
C170	216

SYMBOL NO.	INDEX NO.
C171	216
C172	216
C173	216
C174	216
C175	215
C176	216
C177	215
C178	216
C179	216
C180	216

SYMBOL NO.	INDEX NO.
C181	216
C182	217
C183	216

CONNECTOR

SYMBOL NO.	INDEX NO.
CN101	106
CN102	110
CN103	108
CN104	107
CN105	106
CN106	106
CN107	104
CN108	109
CN109	111

SYMBOL NO.	INDEX NO.
CN111	113
CN112	102
CN113	103
CN114	112
CN116	105

DIODE

SYMBOL NO.	INDEX NO.
D101	125
D102	125
D103	125
D104	125
D105	128
D106	128
DI07	128
D108	128
D109	128
D110	128

40. MAIN CONTROL BOARD (C223)

SYMBOL NO.	INDEX NO.
D111	128
D112	128
D113	125
D114	125
D115	125
D116	129
D117	129
D118	129
D119	129
D120	129

SYMBOL NO.	INDEX NO.
D121	129
D122	129
D123	125

DPS

SYMBOL NO.	INDEX NO.
DPS101	119
DPS102	120

FIL

SYMBOL NO.	INDEX NO.
FIL101	173
FIL102	173
FIL103	173
FIL104	173
FIL105	173
FIL106	173
FIL107	173
FIL108	173
FIL109	173
FIL110	173

SYMBOL NO.	INDEX NO.
FIL111	173
FIL112	173
FIL113	173
FIL114	173
FIL115	172
FIL116	172
FIL117	172
FIL118	172
FIL119	172
FIL120	172

SYMBOL NO.	INDEX NO.
FIL121	172
FIL122	172
FIL123	173
FIL124	173
FIL125	172
FIL126	173
FIL127	173

FUSE

SYMBOL NO.	INDEX NO.
FU101	115
FU101	117
FU102	115
FU102	118

IC

SYMBOL NO.	INDEX NO.
IC103	127
IC104	123
IC105	123
IC107	150
IC110	151
IC112	152
IC113	152
IC116	142
IC118	114
IC120	131

SYMBOL NO.	INDEX NO.
IC121	124
IC123	116
IC124	116
IC126	151
IC129	126
IC131	124
IC137	153

L

SYMBOL NO.	INDEX NO.
L101	171

LED

SYMBOL NO.	INDEX NO.
LED101	130
LED102	130
LED103	130
LED104	130
LED105	130
LED106	130

OSC

SYMBOL NO.	INDEX NO.
OSC101	154

Q

SYMBOL NO.	INDEX NO.
Q101	122
Q102	121

RAY

SYMBOL NO.	INDEX NO.
RAY101	158
RAY102	158
RAY103	155
RAY104	155
RAY105	155
RAY106	155
RAY107	156
RAY108	157
RAY109	156
RAY110	159
RAY111	159
RAY112	155
RAY113	157
RAY114	155
RAY115	155
RAY116	155
RAY117	155
RAY118	155
RAY119	155

RESISTOR

SYMBOL NO.	INDEX NO.
R101	174
R102	197
R103	193
R104	193
R105	193
R106	193
R107	176
R108	176
R109	198
R110	198
R111	193
R112	193
R113	193
R114	193
R115	193
R116	193
R117	177
R118	177
R119	207
R120	183
R121	193
R122	194
R123	194
R124	207
R125	183
R126	179
R127	177
R128	177
R129	186
R130	186
R131	197
R132	179
R133	186
R134	192
R135	186
R136	186
R137	179
R138	186
R139	179
R140	199
R141	190
R142	180
R143	197
R144	179
R145	179
R146	179
R147	179
R148	197
R149	198
R150	200
R151	200
R152	175
R153	187
R154	187
R155	187
R156	180
R157	204
R158	201
R159	210
R160	209
R161	208
R162	211
R163	189
R164	182
R165	180
R166	201
R167	178
R168	207
R169	183
R170	207
R171	205
R172	183
R173	207
R174	205
R175	183
R176	207
R177	205
R178	183
R180	203
R181	193
R182	205
R183	193
R184	205
R185	193
R186	185
R187	196
R188	180
R189	180
R190	180

40. MAIN CONTROL BOARD (C223)

SYMBOL NO.	INDEX NO
R191	180
R192	198
R193	180
R194	202
R195	198
R196	201
R197	180
R198	192
R199	182
R200	206

SYMBOL NO.	INDEX NO.
R201	184
R202	198
R203	179
R204	191
R205	188
R206	181
R207	179
R208	179
R209	179
R210	179

SYMBOL NO.	INDEX NO.
R211	180
R212	188
R213	195
R214	200
R215	193
R216	198
R217	198
R218	198
R219	198
R220	198

SYMBOL NO.	INDEX NO.
R221	198
R222	198
R223	198
R224	198
R225	198

TP

SYMBOL NO.	INDEX NO.
TP101	101
TP102	101
TP103	101
TP104	101
TP105	101
TP106	101
TP107	101

VR

SYMBOL NO.	INDEX NO.
VR101	162
VR102	163
VR103	162
VR104	163
VR105	160
VR106	161

40. MAIN CONTROL BOARD (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C223 8042	Main Control Board	1
1	C223 8045	UVEPROM 512K X8 150NS	1
2	C223 8047	UVEPROM 512K X8 150NS	1
101	1101 0328	Connector Pin Contact	
102	1102 4202	Connector - 3p	
103	1102 4497	Connector - 13p	
104	1102 4818	Connector - 20p	
105	1102 4819	Connector - 22p	
106	1102 4823	Connector - 30p	
107	1102 5219	Connector - 28p	
108	1102 5221	Connector - 26p	
109	1102 5561	Connector - 20p	
110	1102 5563	Connector - 24p	
111	1102 6593	Connector - 9p	
112	1102 7036	Connector - 30p	
113	1102 7290	Connector - 5p	
114	1104 0239	Lsi Socket - 24p	
115	1104 0351	Fuse Holder	
116	1104 0588	Dip Socket - 28p	
117	1107 0413	Fuse 3A	
118	1107 0415	Fuse 5A	

Index No.	Part No.	Description	Q'ty Per Assembly
119	1204 1015	Dip Switch	
120	1204 1481	Dip Switch	
121	1400 0403	Transistor - 2SC1623l6	
122	1400 0455	Transistor - 2SC2873Y	
123	1401 0398	IC - STA402A	
124	1401 0400	Transistor Array - SLA4060	
125	1401 0835	Diode - 1SS190	
126	1401 0876	IC - PA2003GR	
127	1401 0877	IC - TD62083F	
128	1402 0476	Diode - 1SS184	
129	1402 1263	Diode - 200v - 1A	
130	1403 0669	Red LED - SLM-13VW	
131	1407 1535	IC - TD62308AP	
132	1407 2187	IC - SN74LS07NS	
133	1407 2218	TTLIC - SN74LS06NS	
134	1407 2273	IC - TA8050P	
135	1407 2348	IC - TC4051BF	
136	1407 2413	IC - SN74LS138M	
137	1407 2417	TTL - IC - SN74LS240M	
138	1407 2746	IC - CXD1095Q	
139	1407 2855	Switch - TC4S66F	
140	1407 3492	CPU -78C10AGF	
141	1407 3701	IC - TMP82C79M-2	
142	1407 3885	IC - UPD71054GB-10-3B4	
143	1407 4127	IC - TL7705ACPS	
144	1407 4192	IC - SN74LS244M	
145	1407 4234	IC - SN74LS373M	
146	1407 4360	TTL - SN74LS11M	
147	1407 4371	IC - SN74LS145M	
148	1407 4565	IC - TE6251	
149	1408 0604	IC - UPC393G2	
150	1408 0790	IC - UPC324G	
151	1408 0879	IC - IR9358N	
152	1408 0880	IC - IR2339N	
153	1408 1104	IC - MB2803PF-G	

Index No.	Part No.	Description	Q'ty Per Assembly
154	1503 0570	Oscillator - 15mhz	
155	1601 7374	Resistor Array - 4.7K Ω	
156	1601 7376	Resistor Array - 10K Ω ±5% 1/8W	
157	1601 7377	Resistor Array - 15K Ω ±5% 1/8W	
158	1601 7396	Resistor Array - 4.7K Ω	
159	1601 7404	Resistor Array - 10K Ω 1/2W	
160	1601 8145	Variable Resistor - 5K Ω 0.5W	
161	1601 8156	Variable Resistor - 2K Ω 0.5W	
162	1601 8157	Variable Resistor - 100K Ω	
163	1601 8186	Variable Resistor - 200K Ω	
164	1604 2089	Capacitor - 1.0μF 1/8W ±20%	
165	1606 1981	Capacitor - 0.0033μF ±5%	
166	1606 1983	Capacitor - 0.015μF ±5% 50V	
167	1606 1984	Capacitor - 0.022μF ±5% 50V	
168	1606 1985	Capacitor - 0.033μF ±5% 50V	
169	1606 1986	Capacitor - 0.1μF ±5% 16V	
170	1606 2028	Capacitor - 0.22μF ±5%	
171	1607 0001	Coil - SN-8S-500	
172	1607 0280	Inductor - BLM41	
173	1607 0477	Inductor - BLM21A05	
174	1611 4221	Resistor - 220 Ω 1/4T ±5%	
175	1611 6361	Resistor - 360Ω 1/8T ±5%	
176	1611 6470	Resistor - 47 Ω 1/2T ±5%	
177	1630 2101	Resistor - 100Ω 1/8W	
178	1630 2221	Resistor - 220 Ω	
179	1630 3102	Resistor - 1KΩ 1/10W ±5%	
180	1630 3103	Resistor - 10KΩ 1/10W ±5%	
181	1630 3124	Resistor - 120Ω ±5% 1/10W	
182	1630 3133	Resistor - 13KΩ ±5% 1/10W	
183	1630 3151	Resistor - 150KΩ ±5% 1/10W	
184	1630 3154	Resistor - 150K 0HM ±5% 1/10W	
185	1630 3203	Resistor - 20 Ω ±5% 1/10W	
186	1630 3222	Resistor - 2.2KΩ 1/10W ±5%	
187	1630 3223	Resistor - 22kΩ - 1/10W	

Index No.	Part No.	Description	Q'ty Per Assembly
188	1630 3242	Resistor - 2.4KΩ ±5% 1/10W	
189	1630 3243	Resistor - 24KΩ ±5% 1/10W	
190	1630 3244	Resistor - 240KΩ ±5% 1/10W	
191	1630 3302	Resistor - 3kΩ - 1/10W	
192	1630 3303	Resistor - 30K Ω ±5% 1/10W	
193	1630 3332	Resistor - 3.3KΩ 1/10W ±5%	
194	1630 3333	Resistor - 33K Ω ±5% 1/10W	
195	1630 3391	Resistor - 390Ω 1/10W ±5%	
196	1630 3393	Resistor - 39K Ω 1/10W	
197	1630 3471	Resistor - 470Ω - 1/10W	
198	1630 3472	Resistor - 4.7KΩ 1/10W ±5%	
199	1630 3473	Resistor - 47KΩ 1/10W ±5%	
200	1630 3511	Resistor - 510Ω 1/10W ±5%	
201	1630 3513	Resistor - 51KΩ ±5% 1/10W	
202	1630 3514	Resistor - 510KΩ ±5% 1/10W	
203	1630 3562	Resistor - 5.6K Ω ±5% 1/10W	
204	1630 3682	Resistor - 6.8kΩ - 1/10W	
205	1630 3683	Resistor - 68KΩ ±5% 1/10W	
206	1630 3823	Resistor - 82K Ω ±5% 1/10W	
207	1630 3824	Resistor - 820KΩ ±5% 1/10W	
208	1633 3601	Resistor - 3.6KΩ ±5% 1/10W	
209	1633 4121	Resistor - 4.12KΩ ±1%	
210	1633 4991	Resistor - 4.99KΩ ±1%	
211	1633 6041	Resistor - 6.04KΩ ±1%	
212	1640 2101	Capacitor - 100μF ±20% 25V	
213	1640 5100	Capacitor - 10MICROF ±20% 50V	
214	1640 5221	Capacitor - 220μF ±20% 50V	
215	1660 3101	Capacitor - 100PF 50V	
216	1660 3102	Capacitor - 1000PF ±5% 50V	
217	1660 3151	Capacitor - 150PF ±5% 50V	
218	1660 5103	Capacitor - 10000PF ±10% 50V	
219	1660 9104	C - 0.1μF 25V	

41. AC DRIVE BOARD (C223)

CAPACITOR

SYMBOL NO.	INDEX NO.
C301	131
C303	130
C306	129

CONNECTOR

SYMBOL NO.	INDEX NO.
CN301	106
CN302	107
CN303	104
CN304	105

DIODE

SYMBOL NO.	INDEX NO.
D301	122
D303	117
D304	117
D306	117
D307	119
D308	119
D309	119
D310	119

CR

SYMBOL NO.	INDEX NO.
CR303	128
CR304	128

FUSE

SYMBOL NO.	INDEX NO.
FU301	111
FU301 (EU)	134
FU301-1	108

IC

SYMBOL NO.	INDEX NO.
IC301	125

PC

SYMBOL NO.	INDEX NO.
PC301	123

M

SYMBOL NO.	INDEX NO.
M301	118

Q

SYMBOL NO.	INDEX NO.
Q301	115
Q302	116

RA

SYMBOL NO.	INDEX NO.
RA301	113
RA302	112
RA303	114
RA305	112

RESISTOR

SYMBOL NO.	INDEX NO.
R301	126
R302	126
R303	132
R304	132
R305	133

ST

SYMBOL NO.	INDEX NO.
ST301	121

Z

SYMBOL NO.	INDEX NO.
Z301	124

ZD

SYMBOL NO.	INDEX NO.
ZD301	120
ZD302	120

41. AC DRIVE BOARD (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C223 8058	AC Drive Board - 120V	1
*	C223 8064	AC Drive Board - 230V	1

Index No.	Part No.	Description	Q'ty Per Assembly
104	1102 2402	Connector - 4p	
105	1102 4201	Connector - 2p	
106	1102 4204	CT Header - 5p	
107	1102 4206	Connector - 7p	
108	1104 0351	Fuse Holder	
111	1107 0354	Fuse - 3.15A 125V	
112	1208 1245	Relay - DC24V	
113	1208 1263	Relay - AC100V	
114	1208 1317	Relay - DC24V	
115	1400 0072	Transistor - 2SC37Y	
116	1400 0234	Transistor - 2SA673A-C	
117	1401 0611	Diode - IS1588	
118	1401 0870	FET 2SK724	
119	1402 0110	Silicon Diode - 200V-1.7A (R.M.S)	
120	1402 0452	Zener Diode - RD18FB	
121	1402 0646	Diode - S5VB20	
122	1402 1204	Diode - 5A 800V	
123	1403 0519	Photocoupler - TLP621	
124	1404 0135	Varistor - 270V	
125	1408 0827	IC - TA8429H	
126	1600 1522	Resistor - 6.8K Ω 7W ± 20%	
127	1600 1523	Resistor - 1 Ω 10W ± 10%	
128	1602 1501	Resistor - 120Ω 0.1μF	
129	1604 1382	Capacitor - 10μF 50V	
130	1604 2359	Capacitor - 100μF DC50V ± 20%	
131	1604 2621	Capacitor - 330μF ± 20%	
132	1611 4152	Resistor - 1.5K Ω 1/4T ± 5%	
133	1611 4512	Resistor - 5.1K Ω 1/4T ± 5%	

42. IMAGE PROCESSING BOARD (C223)

CAPACITOR

SYMBOL NO.	INDEX NO.
C401	120
C402	122
C403	124
C404	124
C405	124
C406	124
C407	124
C408	124
C409	122
C410	122

SYMBOL NO.	INDEX NO.
C4ll	122
C412	122
C413	122
C414	121
C415	122
C416	122
C417	122
C418	124
C419	122
C42O	124

SYMBOL NO.	INDEX NO.
C421	122
C422	122
C423	122
C424	122
C425	121
C426	122
C427	121
C428	121
C429	122
C430	122

SYMBOL NO.	INDEX NO.
C431	122
C432	121
C433	121
C435	122
C436	123
C467	122
C438	122
C439	122
C440	124

SYMBOL NO.	INDEX NO.
C441	122
C442	122
C443	122
C444	122
C445	122
C446	122
C447	122
C448	122
C449	122
C450	122

SYMBOL NO.	INDEX NO.
C451	122
C452	122
C453	122
C454	122
C455	122
C456	122
C457	122
C458	122
C459	122
C460	124

SYMBOL NO.	INDEX NO.
C461	124
C462	122
C463	122
C465	122
C466	124
C467	122
C468	122
C469	124
C470	122

SYMBOL NO	INDEX NO.
C471	122
C472	122
C473	124
C475	124
C476	124
C477	122
C478	122
C479	122
C480	122

SYMBOL NO.	INDEX NO.
C481	122
C482	122
C483	122
C484	122
C485	122
C486	122
C487	122
C488	122
C489	122
C490	122

CONNECTOR

SYMBOL NO.	INDEX NO.
CN401	102
CN402	104
CN403	103
CN404	105
CN405	106

FIL

SYMBOL NO.	INDEX NO.
FIL401	115
FIL402	115
FIL403	115
FIL404	115
FIL405	115
FIL406	115
FIL407	115
FIL408	115
FIL409	115
FIL410	115

SYMBOL NO.	INDEX NO.
FIL411	115
FIL412	115
FIL413	115
FIL414	115
FIL415	115
FIL416	115
FIF417	115
FIL418	115
FIL419	115
FIL420	115

42. IMAGE PROCESSING BOARD (C223)

IC

SYMBOL NO	INDEX NO.
FIL421	115

SYMBOL NO.	INDEX NO.
IC401	109
IC402	112
1C403	126
IC404	126
1C405	111
IC406	1
IC407	126
IC408	4
IC409	113
IC410	126

SYMBOL NO.	INDEX NO.
IC411	2
IC412	5
1C413	126
IC414	126
1C415	126
IC416	126
IC417	126
IC418	126
IC419	126
IC420	108

SYMBOL NO.	INDEX NO.
IC421	126
1C422	110
1C423	107
IC424	107
IC425	126
IC426	111
IC428	6
IC430	3

SYMBOL NO.	INDEX NO.
IC431	126
IC437	126
IC438	126
IC439	126
IC440	111

RESISTOR

SYMBOL NO.	INDEX NO.
R401	118
R402	117
R403	116
R404	117
R405	117
R406	116
R407	116
R408	117
R409	117
R410	116

SYMBOL NO.	INDEX NO.
R411	117
R412	117
R414	117
R415	117
R416	116
R417	116
R418	117
R419	117
R420	117

SYMBOL NO.	INDEX NO.
R421	117
R422	119
R423	118
R424	118
R425	119
R426	117
R427	117
R428	118
R429	118
R430	117

SYMBOL NO.	INDEX NO.
R431	119
R432	117
R433	117
R434	117
R435	117
R436	117
R437	117
R438	117
R439	117
R440	117

SYMBOL NO.	INDEX NO.
R441	117
R442	117
R443	117
R444	117
R445	117
R446	116
R447	119
R448	117
R449	117
R450	119

SYMBOL NO.	INDEX NO.
R452	117
R453	117
R454	117
R455	117
R456	117
R457	118
R458	118
R459	118
R460	118

SYMBOL NO.	INDEX NO.
R461	118
R462	118
R463	118
R464	118
R465	118
R466	118
R467	118
R468	118
R469	118
R470	118

42. IMAGE PROCESSING BOARD (C223)

SYMBOL NO.	INDEX NO.
R471	**118**
R472	**118**
R473	**118**
R474	**118**
R475	**118**

TP

SYMBOL NO.	**INDEX NO.**
TP401	101
TP402	101
TP403	101

OSC

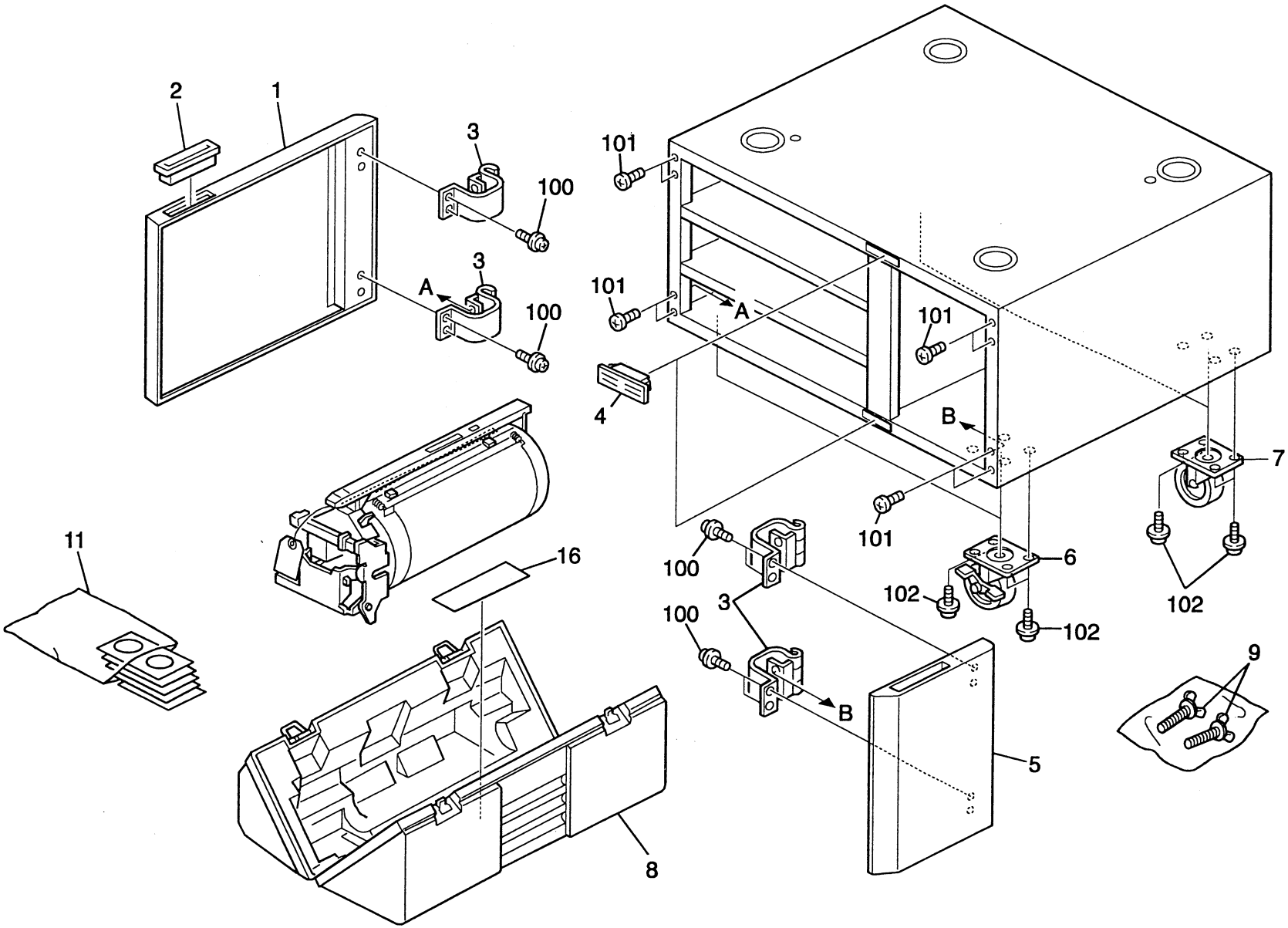
SYMBOL NO.	**INDEX NO.**
OSC401	**114**

42. IMAGE PROCESSING BOARD (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C223 8017	IPU Board	1
1	A012 5226	IC - TC19G060AF0027	1
2	A037 5222	IC - TC23SC100AF	1
3	C222 8008	IC - KG9F003024C	1
4	C223 8090	IC - MN56030RTE	1
5	C223 8091	IC - UPD65622GF-184-3	1
6	C223 8092	IC - MBCG24692-4432	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1101 0328	Connector Pin Contact	
102	1102 5312	Connector - 7p	
103	1102 5572	Connector - 30p	
104	1102 6576	Connector - 60p	
105	1102 7297	Connector - 120p	
106	1103 1332	Connector - 26p	
107	1104 0588	Dip Socket - 28p	
108	1407 2413	IC - SN74LS138M	
109	1407 2417	TTL - IC - SN74LS240M	
110	1407 3677	IC - MN8357	
111	1407 4192	IC - SN74LS244M	
112	1407 4384	TTL - SN74LS174M	
113	1407 4528	IC - CY7C167A-35PC	
114	1503 0680	Osocirrater - CSA20 OMXZ240	
115	1607 0477	Inductor - BLM21A05	
116	1630 2471	Resistor - 470Ω 1/8W ±5%	
117	1630 3102	Resistor - 1KΩ 1/10W ±5%	
118	1630 3103	Resistor - 10KΩ 1/10W ±5%	
119	1630 3472	Resistor - 4.7KΩ 1/10W ±5%	
120	1642 0101	Capacitor - 100μF ±20% 50V	
121	1660 3151	Capacitor - 150PF ±5% 50V	
122	1660 3220	Capacitor - 122PF ±5% 50V	
123	1660 3221	Capacitor - 220PF ±5% 50V	
124	1660 5103	Capacitor - 10000PF ±10% 50V	
125	1660 9104	C - 0.1μF 25V	
126	1902 0003	SRAM - 64k - X8 - 100ns	

43. TABLE SECTION (C223)



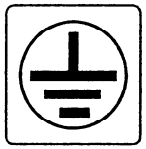
43. TABLE SECTION (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
1	C546 2020	Left Door	1
2	C546 2030	Door Grip	1
3	C525 2031	Door Hinge	4
4	C525 2032	Door Catch	2
5	C546 2025	Right Door	1
6	C525 2039	Caster Stopper	2
7	C525 2038	Caster	2
8	C526 2202	Option Drum Case	1
9	C546 2035	Adjusting Screw	2
10	C526 2113	Decal - Drum Set	1
11	C526 2150	Drum Decal - Black	1
11	C526 2151	Drum Decal - Red	1
11	C526 2152	Drum Decal - Blue	1
11	C526 2153	Drum Decal - Green	1
11	C526 2154	Drum Decal - Brown	1

Index No.	Part No.	Description	Q'ty Per Assembly
100	0951 4006B	Philips Screw With Washer - M4x6	
101	0960 3008B	Philips Flange Screw - M3x8	
102	0950 5012B	Philips Screw With Flat Washer - M5x12	

44. DECAL AND DOCUMENT. (C223)

1



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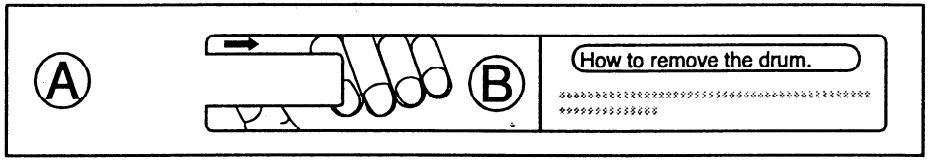
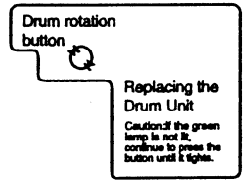
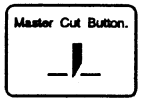


7


Drum rotation button
Replacing the Drum Unit
Caution:If the green lamp is not lit, continue to press the button until it lights.

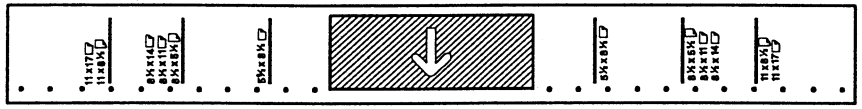
3



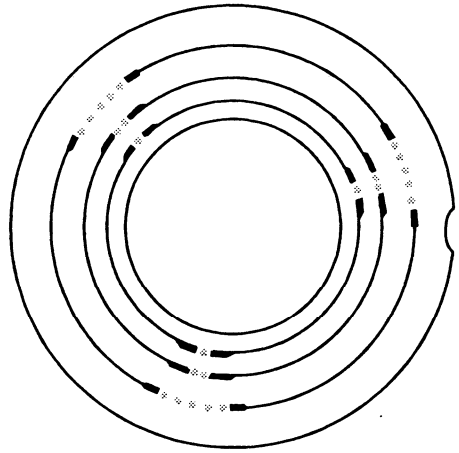
4

8

5



9



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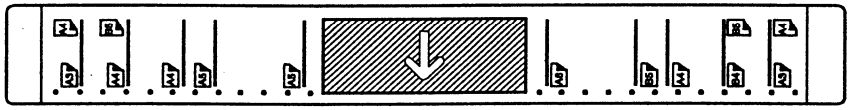

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44. DECAL AND DOCUMENT (C223)

10

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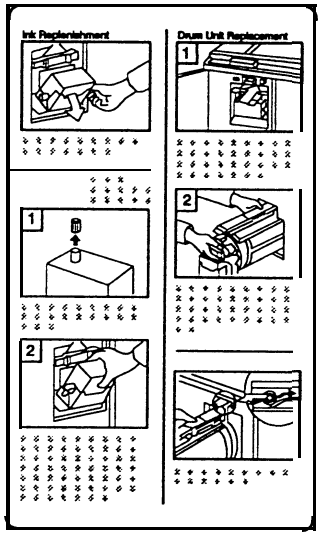

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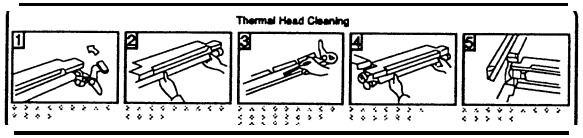

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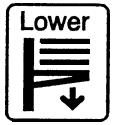


15

Transport position
position transport
posicion de transporte
posizione di trasporto
Transport-position

Operiting position
posicion travail
posicion de funzionamiento
posizione di funzionamento
Betriebs-position

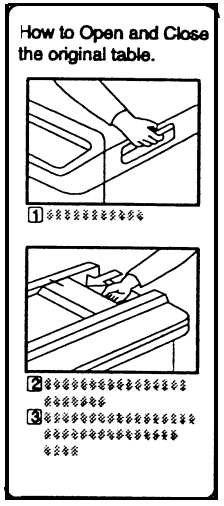
16

Operiting position
posicion travail
posicion de funzionamiento
posizione di funzionamento
Betriebs-position

Transport position
position transport
posicion de transporte
posizione di trasporto
Transport-position

44. DECAL AND DOCUMENT (C223)

17



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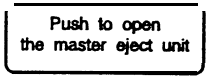

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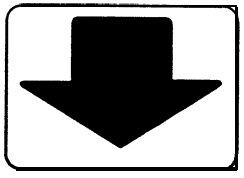

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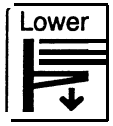

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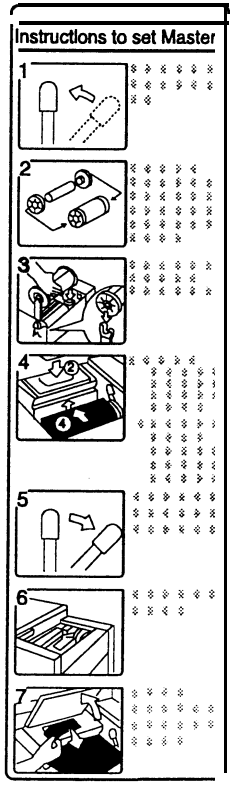
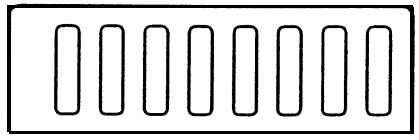


23

When you have set the new Master the cut Master should be removed by opening this cover.
(Caution)if the cut Masuter is not removed, this will cause a paper jam.

24



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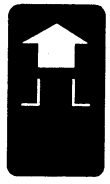

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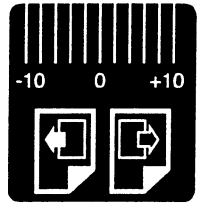

44. DECAL AND DOCUMENT (C223)

Index No.	Part No.	Description	Q'ty Per Assembly
*	C223 8600	Operating Instructions - English A4 (RIC)	1
*	C223 8607	Operating Instructions - English LT (RIC)	1
*	C223 8608	Operating Instructions - English ASIA	1
*	C223 8650	Operating Instructions - English (SVN)	1
*	C223 8690	Operating Instructions - English A4 (NRG)	1
*	C223 8697	Operating Instructions - English LT (NRG)	1
*	C223 8647	Operating Instructions - English (AB DICK)	1
*	C218 2910	Caution Decal - French	1
*	C218 2911	Caution Decal - Spanish	1
*	C218 2912	Caution Decal - Italian	1
*	C218 2913	Caution Decal - German	1
1	AA00 1190	Decal - Ground	1
2	C201 2543	Decal - Drum Caution	1
3	C203 2759	Master Cutter Decal	1
4	C210 2804	Decal - Caution	1
4	C218 2910	Caution Decal - French	1
4	C218 2911	Caution Decal - Spanish	1
4	C218 2912	Caution Decal - Italian	1
4	C218 2913	Caution Decal - German	1
5	C210 2805	Decal - Paper Size	1
6	C210 2806	Decal - Paper Size	1
7	C210 2813	Decal - Replacing The Drum Unit	1
8	C217 2514	Decal - Main Switch	1
9	C218 2507	Decal - Master Flange	1
10	C218 2516	Decal - Original Scale - A4	1
10	C218 2820	Decal - Original Size - LT	1
11	C218 2816	Decal - Drum Replacement - LT	1
12	C218 2817	Decal - Replacement	1
13	C218 2818	Decal - Paper Feed Pressure - LT	1
14	C218 2819	Decal - Paper Table Down	1
15	C218 2821	Decal Font Fixting	1
16	C218 2822	Decal - Rear Fixting	1
17	C218 2824	Decal - Original Table - LT	1
18	C218 2825	Decal - Master Eject Open	1
19	C218 2827	Decal - Master Feed	1

Index No.	Part No.	Description	Q'ty Per Assembly
20	C218 2841	Decal - Paper Table Doun	1
21	C218 8430	Decal - Newtral	1
22	C222 2552	Decal - Master Set	1
22	C222 2565	Multi Decal - Master Set - German	1
22	C222 2566	Multi Decal - Master Set - French	1
22	C222 2567	Multi Decal - Master Set - Italian	1
22	C222 2568	Multi Decal - Master Set - Spanish	1
23	C222 2553	Caution Decal - Master Set	1
24	C222 2554	Decal - Mode	1
25	C223 2452	Decal - Paper Table Knob	1
26	C223 2453	Decal - Paper Level	1

PARTS INDEX

Part No.	Description	Page and Index No.
AA00 1190	Decal - Ground	97- 1
AA00 2010	Decal - Paper Level	87- 5
AA06 3016	Pressure Spring	17- 28
AA14 3062	Shoulder Screw - M4	37- 27
AA16 2053	Platen Cover Pad	13- 5
AB03 0216	Pulley - 15Z	81- 33
AC02 0046	CCD Lens F4/43	61- 29
AG07 0004	Magnetic Catch	41- 12
AG07 0004	Magnetic Catch	79- 8
AG07 0004	Magnetic Catch	83- 17
AW02 0021	Photointerruptor - 175487-3	25- 37
AW02 0021	Photointerruptor - 175487-3	29- 23
AW02 0021	Photointerruptor - 175487-3	37- 21
AW02 0021	Photointerruptor - 175487-3	65- 5
AW02 0021	Photointerruptor - 175487-3	81- 1
AW02 0075	Photointerrupter	77- 23
C200 2221	Collar - Pressure Cam Shaft	19- 7
C200 2224	Plate Nut - Print Pressure Cam	19- 9
C200 2225	Pressure Cam Shaft	19- 8
C200 2232	Drive Shaft	19- 1
C200 2248	Fixing Plate	19- 4
C200 2266	Bearing Holder	21- 21
C200 2267	Spacer	19- 21
C200 2302	Image Shifting Arm - Large	21- 16
C200 2308	Image Shifting Arm - Small	21- 19
C200 2311	Image Shifting Link	21- 17
C200 2338	Gear - 20T	73- 1
C200 2596	Maim Board Stud - Long	83- 21
C200 3053	Magnet Catch	87- 12
C200 3123	Support Plate - Safety Switch (A4)	81- 7
C200 3508	Master Eject Stay - Small	77- 14
C200 3529	Pulley Plate	75- 22
C200 3547	Pulley	75- 21
C200 3553	Solenoid Bracket	75- 15
C200 3554	Solenoid Arm	75- 16

Part No.	Description	Page and Index No
C200 3606	Coupled Gear - 62T & 20T	75- 3
C200 3627	Gear - 30T	75- 2
C200 3628	Gear - 20T	75- 6
C200 3629	Gear - 20T	57- 26
C200 3712	Pulley	77- 5
C200 3716	Cushion Shaft	17- 20
C200 3755	Plate Spring	83- 18
C200 3953	Middle Lever	43- 17
C200 3954	Lower Lever	43- 20
C200 3956	Middle Lever Spring	43- 18
C200 3957	Lower Lever Spring	43- 21
C200 4116	Sensor Spring	67- 28
C200 4184	Tension Spring	71- 15
C200 4520	Lock Pin - Drum	17- 10
C200 4551	Slide Guide	35- 2
C200 4561	Clamper Spring	35- 4
C200 4625	Drum Rail	53- 7
C200 4627	Drum Rail Shaft	53- 18
C200 4631	Left Arm - Drum Lock	51- 12
C200 4632	Right Arm - Drum Lock	51- 15
C200 4633	Drum Lock Shaft - Long	51- 13
C200 4635	Drum Lock Spring - Right	51- 14
C200 4638	Drum Lock Shaft - Small	51- 20
C200 4653	Drum Shaft Bracket	53- 17
C200 4653	Drum Shaft Bracket	55- 5
C200 4653	Drum Shaft Bracket	57- 10
C200 4723	Adjusting Plate - Doctor Roller	57- 2
C200 4733	Ink Detector Bracket	57- 19
C200 4748	Gear - 45T	57- 27
C200 4814	Bushing - 6x10x55mm	49- 4
C200 4826	Pump Rubber	49- 25
C200 4861	Pump Clutch Sleeve	49- 13
C200 4862	Ink Stopper	49- 10
C200 4864	Bracket - Ink Supply Solenoid	49- 7
C200 4914	Drum Stopper Spring	49- 3

Part No.	Description	Page and Index No.
C200 4924	Right Shaft - Ink Holder	49- 30
C200 4926	Ink Holder Cam	49- 17
C200 4942	Pinion - 9T	55- 26
C200 4944	Sector Gear - 9T	55- 8
C200 4945	Sector Gear Spring	55- 10
C200 4946	Clamper Secter Shaft	55- 7
C200 5025	Paper Feed Plate Shield	23- 4
C200 5042	Rear Shaft - Paper Feed	25- 28
C200 5118	Release Spring	51- 4
C200 5137	Left Bracket - Guide Plate	33- 14
C200 5138	Right Bracket - Guide Plate	33- 17
C200 5150	Bushing - 7x18x9mm	33- 3
C200 5153	Bushing Supporter	33- 1
C200 5154	Left Spring Arm	33- 7
C200 5155	Right Spring Arm	33- 29
C200 5205	Paper Feed Spring	35- 26
C200 5222	Sector Spring	21- 24
C200 5222	Sector Spring	35- 29
C200 5223	Lift Cam	21- 26
C200 5225	Bracket - Paper Feed Solenoid	35- 16
C200 5226	Link - Paper Feed Solenoid	35- 13
C200 5235	Paper Feed Solenoid Spring	35- 14
C200 5287	Rubber Plat - Paper Feed	25- 5
C200 5340	Upper Feed Roller	33- 9
C200 5503	Paper Detecting Shaft	33- 22
C200 5504	Paper Detecting Pin	33- 21
C200 5526	Print Pressure Bushing	37- 2
C200 5541	Print Pressure Arm	37- 16
C200 5565	Print Pressure Stopper	35- 11
C200 5566	Pressure On/off Lever	37- 15
C200 6004	Exit Pawl Lever	47- 25
C200 6059	Pulley - 25T	47- 9
C200 8446	Copy Counter	83- 1
C201 2211	Stud	21- 10
C201 2221	Gear - 40T	21- 8

Part No.	Description	Page and Index No
C201 2222	Coupled Gear - 20T & 60T	21- 9
C201 2425	Adjusting Lever	27- 8
C201 2543	Decal - Drum Caution	53- 2
C201 2543	Decal - Drum Caution	97- 2
C201 3527	Pressure Spring	75- 25
C201 3529	Lower Pulley Shaft	75- 19
C201 4067	Pump Clutch Collar	49- 14
C201 4531	Drum Stopper Pawl	17- 3
C201 4532	Drum Stopper Roller	17- 4
C201 4533	Drum Stopper Spring	17- 2
C201 4604	Drum Rail Roller	53- 10
C201 4606	Stopper Releasing Plate	17- 6
C201 4606	Stopper Releasing Plate	53- 6
C201 4609	Stopper Relasing Lever	53- 5
C201 4610	Drum Slider Spring	53- 9
C201 4611	Front Stopper Guide (AB DICK)	53- 3
C201 4613	Drum Rail Cover	53- 4
C201 4636	Drum Unit Handle	51- 23
C201 4639	Ink Holder Handle	49- 28
C201 4665	Bearing Holder	57- 5
C201 4676	Clutch Spring	49- 12
C201 4679	Ink Pump Slider	49- 21
C201 4682	Ink Cartridge Spring	49- 29
C201 5015	Seal - M10	25- 6
C201 5051	Pinion - 24T	29- 17
C201 5073	Arm Balancer - Feed Roller	27- 21
C201 5075	Guide Plate Bracket	31- 1
C201 5080	Separation Roller Pressure Spring	35- 52
C201 5090	Separation Roller Pressure Stud	29- 5
C201 5101	Link	35- 19
C201 5125	Shoulder Screw - M4	33- 2
C201 5125	Shoulder Screw - M4	33- 8
C201 5125	Shoulder Screw - M4	35- 36
C201 5125	Shoulder Screw - M4	81- 38
C201 5134	Bearing Holder	33- 4

Part No.	Description	Page and Index No.
C201 5142	Lift Arm - Feed Roller	33- 23
C201 5145	Lift Arm Spring	33- 24
C201 5505	Height Sensor Bracket	33- 28
C203 2083	Exit Pawl Bushing	35- 32
C203 2091	Front Shaft	15- 10
C203 2096	Bottom Stay Nut	15- 16
C203 2128	AC Drive Board Cover	81- 40
C203 2215	Gear - 18T	19- 18
C203 2309	Pulse Disk	29- 19
C203 2311	Gear Flange	19- 19
C203 2312	Pulley	19- 11
C203 2316	Timing Belt	19- 12
C203 2317	Pulley - 26Z	19- 5
C203 2318	Reinforcement Plate	21- 22
C203 2326	Gear - 90Z	19- 14
C203 2327	Pulley Flange	19- 13
C203 2759	Master Cutter Decal	81- 14
C203 2759	Master Cutter Decal	97- 3
C203 3511	Arm - MasterEject Box	79- 7
C203 4013	Brake Plate	67- 21
C203 4060	Tension Release Slider	71- 6
C203 4511	Spring Plate Supporter	17- 46
C203 4512	Grounding Spring Plate	17- 47
C203 4515	Drum Clamper Roller	35- 1
C203 4543	Ink Detector	57- 17
C203 5007	Paper Feed Lever	27- 2
C203 5013	Lever Supporter	27- 10
C203 5020	Spring - Feed Roller Pressure	27- 14
C203 5027	Adjusting Plate	27- 16
C203 5045	Bushing - 18x24x28mm	27- 12
C203 5046	Bushing - 14x20x9mm	27- 37
C203 5049	Front Bushing Stud	27- 41
C203 5050	Rear Bushing Stud	27- 40
C203 5055	Actuator - Paper Feed Table	27- 19
C203 5062	Left Arm - Separation	29- 4

Part No.	Description	Page and Index No
C203 5066	Right Arm - Separation	29- 9
C203 5113	Bushing - 6x9x3mm	25- 19
C203 5113	Bushing - 6x9x3mm	27- 17
C203 5114	Bushing - 3x6x3mm	25- 21
C203 5116	Washer - 6x13x12mm	25- 20
C203 5121	Bushing - 8x12x9mm	25- 15
C203 5126	Right Rack - Paper Feed	25- 34
C203 5131	Gear Cover	25- 11
C203 5135	Bushing - 10x14x5.9	29- 1
C203 5142	Rack Shaft	25- 12
C203 5170	Feed Cam Shaft	21- 12
C203 5184	Sector Gear	21- 25
C203 5194	Shoulder Screw - M4	35- 24
C203 5198	Feed Roller Brake Ass'y	33- 19
C203 5200	Tension Roller	27- 26
C203 5201	Tension Arm	27- 25
C203 5205	Belt Tensioner Ass'y	27- 22
C203 5208	Tension Bracket	27- 23
C203 5215	Tension Spring	27- 24
C203 5220	Gear - 18T	27- 39
C203 5225	Spacer - Tension - Paper Feed	27- 49
C203 6035	Magnet Plate	41- 10
C203 6046	Link - Wing	41- 4
C203 6047	Rubber Washer	41- 3
C203 6065	Pulley Flange	39- 5
C203 8095	Upper Harness Supporter	81- 5
C203 8137	Master Sensor	73- 21
C203 8204	Grounding Wire	79- 18
C207 2209	Pulley - 60Z	19- 20
C207 2210	Timing Belt - 100S4.5M297	19- 24
C207 2211	Bearing Stopper	19- 25
C207 3530	Upper Pulley Shaft	75- 20
C207 3604	Pulley - 40Z	75- 5
C207 3612	Timing Belt - B30S2M126	75- 4
C207 4150	Fixing Screw	69- 14

Part No.	Description	Page and Index No.
C207 4611	Front Stopper Guide (RIC)(NRG)(SVN)	53- 3
C207 4670	Gear - 24Z	57- 4
C207 4672	Gear - 36Z	57- 3
C207 5008	Pressure Plate	31- 4
C207 5009	Pressure Plate Holder	31- 3
C207 5010	Adjusting Screw	31- 6
C207 5011	Adjusting Plate	31- 5
C207 5012	Pressure Spring	31- 7
C207 5013	Pressure Spring - Paper Feed	31- 2
C207 5020	Upper Roller Shaft	27- 32
C207 5023	Separator Roller Ass'y	27- 30
C207 5123	Upper Guide Plate	33- 12
C207 5125	Guide Plate Spacer	33- 13
C207 5138	Upper Feed Roller Ass'y	33- 6
C207 5148	Upper Feed Roller	33- 10
C207 6125	Guide Plate Spring	75- 13
C209 2006	Spacer	15- 20
C209 2027	Lever Bracket - Paper Feed	27- 11
C209 2034	Sensor Bracket	33- 5
C209 2050	Front Stay	15- 12
C209 2056	Right Fixing Plate	17- 30
C209 2061	Left Grip - Paper Feed	15- 6
C209 2110	Drive Support Shaft	17- 23
C209 2130	Safety Cover	81- 17
C209 2169	Harness Bracket	81- 9
C209 2207	Pulley - 12Z	19- 23
C209 2214	Gear - 40Z	19- 16
C209 2216	Driver Shaft	19- 17
C209 2218	Drum Drive Gear/pulley	19- 2
C209 2220	Support Gear - 30Z	19- 3
C209 2304	Support Side Plate	21- 20
C209 2306	Drum Sensor Bracket	81- 2
C209 2308	Support Bracket - Rear Cover	19- 27
C209 2321	Bracket - Image Shifting	21- 7
C209 2325	Motor Bracket	21- 3

Part No.	Description	Page and Index No
C209 2411	Right Cover Support Bracket	11- 13
C209 2413	Right Cover Bracket	15- 5
C209 2432	Upper Hinge Bracket	11- 7
C209 2435	Lower Hinge Bracket	11- 9
C209 2469	Door Catch	11- 5
C209 2469	Door Catch	83- 6
C209 2470	Left Cover Cap	11- 11
C209 2572	Upper Pad - Rear Cover	11- 29
C209 2574	Side Pad - Rear Cover	11- 30
C209 2579	Lower Pad - Master Eject Box	77- 8
C209 2580	Right Pad - Master Eject Box	77- 11
C209 2581	Left Pad - Master Eject Box	77- 9
C209 2585	Plotter Base Pad - Small	67- 12
C209 3133	Retaining Ring - M6	63- 18
C209 3133	Retaining Ring - M6	79- 16
C209 3501	Front Side Plate	77- 17
C209 3507	Master Eject Sensor Cover	77- 21
C209 3512	Rear Side Plate	77- 6
C209 3516	Master Eject Stay	75- 8
C209 3520	Separation Roller Bushing	75- 26
C209 3521	Arm Connecting Shaft	75- 36
C209 3522	1st Upper Eject Roller	75- 27
C209 3524	1st Lower Eject Roller	75- 30
C209 3526	Bottom Plate - Master Eject Box	77- 7
C209 3529	Sensor Bracket - Master Eject	75- 10
C209 3530	Sensor Cover - Master Eject	75- 9
C209 3531	Pressure Plate	77- 15
C209 3532	Pressure Plate Shaft	77- 16
C209 3533	Plessure Plate Arm	77- 3
C209 3536	Pulley	77- 2
C209 3539	Pressure Arm Shaft	77- 13
C209 3540	Front Pressure Arm	77- 19
C209 3543	Rear Pressure Arm	77- 1
C209 3545	Gear - 62Z	75- 1
C209 3550	Worm Gear - 16/50Z	75- 31

Part No.	Description	Page and Index No.
C209 3551	Gear - 16/116Z	75- 32
C209 3554	Gear - 60Z	77- 18
C209 3557	Bracket	75- 33
C209 3558	Master Eject Box	79- 6
C209 3558	Master Eject Box	85- 5
C209 3561	Master Eject Sensor	75- 35
C209 3571	Blower Duct	79- 13
C209 3574	Blower Fan Bracket	79- 11
C209 3615	Spacer - 6x12x3	77- 20
C209 3642	Master Eject Stay - Large	77- 12
C209 3643	Lock Stay	77- 22
C209 3661	Solenoid Plate	75- 14
C209 3671	Master Eject Hinge	79- 2
C209 3675	Cover Bracket	79- 4
C209 4019	Plotter Middle Stay	73- 17
C209 4021	Holder - Master	67- 22
C209 4025	Master Roller Holder	69- 7
C209 4027	Master End Sensor Bracket	67- 29
C209 4040	Left Adjusting Plate	67- 9
C209 4049	Gear - 48Z	69- 15
C209 4059	Lever Knob	41- 9
C209 4059	Lever Knob	67- 33
C209 4063	Lever Shaft	67- 31
C209 4070	Upper Master Feed Roller	71- 14
C209 4071	Gear -25Z	71- 3
C209 4072	Gear - 24Z	71- 7
C209 4074	Lower Master Feed Roller	71- 16
C209 4075	Left Arm - Tension Release	71- 8
C209 4076	Tension Release Arm	67- 35
C209 4076	Tension Release Arm	71- 10
C209 4082	Tension Release Shaft	71- 9
C209 4087	Gide Plate Roller	65- 17
C209 4093	Reverse Guide	71- 13
C209 4100	Upper Reverse Roller	73- 14
C209 4105	Lower Reverse Roller	73- 16

Part No.	Description	Page and Index No
C209 4114	Gear - 20/27Z	73- 19
C209 4115	Gear - 30Z	71- 2
C209 4116	Spacer - 6x36x0.3	71- 1
C209 4128	Harness Bracket	73- 5
C209 4139	Spring Plate	67- 6
C209 4180	Thermal Head Spacer	67- 3
C209 4190	Stud	17- 21
C209 4300	Counter Roller	73- 12
C209 4303	Gear -27Z	73- 3
C209 4305	Gear - 16Z	73- 2
C209 4307	Reverse Guide Plate	73- 10
C209 4320	Antistatic Brush	71- 11
C209 4321	Antistatic Brush	71- 19
C209 4516	Slide Guide - Drive Shaft	35- 31
C209 4519	Drum Sensor Bracket	17- 13
C209 4529	Drum Stopper	49- 2
C209 4531	Drum Shaft	55- 16
C209 4540	Screen Plate Spring	55- 23
C209 4550	Black Seal - 40x50	55- 20
C209 4566	Drum Lock Shaft	51- 3
C209 4567	Left Arm - Drum Lock	51- 5
C209 4568	Solenoid Bracket - Drum Lock	51- 7
C209 4613	Rear Side Plate - Drum	55- 3
C209 4616	Side Plate Cover - Drum	51- 1
C209 4617	Lower Cover - Drum Side Plate	51- 10
C209 4620	Upper Cover - Drum Side Plate	51- 2
C209 4624	Front Side Plate	51- 9
C209 4634	Drum Lock Spring - Left	51- 11
C209 4637	Right Stopper - Drum Lock	51- 19
C209 4638	Left Stopper - Drum Lock	51- 21
C209 4639	Release Lever - Drum Lock	51- 18
C209 4640	Paper Table Ass'y	23- 2
C209 4641	Ink Holder	49- 31
C209 4642	Drum Lock Spring	51- 22
C209 4654	Spacer - 16x36x5.7	57- 9

Part No.	Description	Page and Index No.
C209 4661	Front Side Plate - Ink Roller	57- 24
C209 4662	Rear Side Plate - Ink Roller	57- 7
C209 4664	Ink Roller Stay	57- 23
C209 4666	Ink Roller	57- 22
C209 4672	Gear - 50Z	55- 15
C209 4673	Gear - 62Z	53- 16
C209 4674	Gear - 25Z	49- 11
C209 4677	Clutch Bracket	49- 15
C209 4681	Stopper Plate	53- 15
C209 4682	Screen Front Plate	55- 27
C209 4688	Gear Support Plate	55- 12
C209 4689	Interrupter Plate	55- 9
C209 4704	Packing - Ink Tube	57- 12
C209 4705	Ink Distributor	57- 15
C209 4711	Hose Band	47- 2
C209 4711	Hose Band	49- 24
C209 4711	Hose Band	57- 14
C209 4712	Spacer	57- 28
C209 4713	Hose Band	57- 29
C209 4715	Shaft Stay - Ink Roller	57- 16
C209 4722	Doctor Roller	57- 20
C209 4749	Grounding Plate	57- 1
C209 4814	Metal Screen Mylar	53- 19
C209 4816	Stopper Plate - Ink Antechamber	49- 23
C209 4817	Ink Tube - Small	49- 22
C209 4850	Screen mylar	55- 19
C209 4852	Gear - 46Z	49- 5
C209 4867	Gear - 64Z	49- 18
C209 4923	Right Shaft - Ink Holder	49- 26
C209 4930	Seal - 0.1x5x17	49- 27
C209 4938	Clamper Magnet	55- 24
C209 4941	Clamper Shaft	55- 25
C209 4947	Clamper Rubber	55- 28
C209 5018	Separation Plate	31- 9
C209 5035	Arm - Feed Roller Holder	27- 18

Part No.	Description	Page and Index No
C209 5047	Switch Bracket - Paper Table	23- 12
C209 5055	Bracket - Paper Size	23- 10
C209 5058	Psper Size Plate	25- 23
C209 5080	Stepped Screw	27- 13
C209 5081	Spring Link	27- 15
C209 5090	Rubber Plate - Paper Feed Guide	25- 4
C209 5092	Rubber Plate Lever	25- 7
C209 5152	Cover Stopper - Large	87- 1
C209 5155	Bottom Plate - Large	87- 10
C209 5162	Bottom Plate - Small	87- 21
C209 5175	Side Frame	87- 4
C209 5200	Gear - 14Z	33- 25
C209 5203	Lower 2nd Feed Roller	33- 20
C209 5205	Left Lever Bracket	29- 14
C209 5206	Right Lever Bracket	29- 11
C209 5207	Spring Plate - Left Lever	29- 15
C209 5208	Spling Plate - Right Lever	29- 10
C209 5209	Separation Pressure Lever	29- 13
C209 5210	Left Lever Cover	29- 16
C209 5211	Right Lever Cover	29- 12
C209 5220	Spacer - 4x20x6	27- 1
C209 5225	Feed Roller Holder	27- 20
C209 5235	Paper Table Holder	25- 35
C209 5507	Sensor Actuaitor	37- 1
C209 5515	Paper Detecting Arm	33- 27
C209 5521	Joint Shaft	37- 17
C209 5543	Press Roller Spring Link	37- 18
C209 6003	Vacuum Plate Bracket	41- 2
C209 6005	Vacuum Plate	41- 1
C209 6009	Drive Roller - Transport Belt	39- 2
C209 6016	Transport Belt	39- 3
C209 6017	Vacuum Duct	39- 4
C209 6019	Idler Roller - Transport Belt	39- 1
C209 6025	Transport Left Wing	41- 7
C209 6028	Transport Right Wing	41- 5

Part No.	Description	Page and Index No.
C209 6050	Bushing - 4x8x6 mm	41- 6
C209 6052	Drive Roller Arm	39- 7
C209 6064	Gear - 28Z	47- 15
C209 6065	Drive Shaft - Vacuum Roller	47- 6
C209 6067	Timing Belt - 220XL025G	47- 26
C209 6104	Exit Cam Shaft	43- 2
C209 6107	Left Exit Cam	43- 27
C209 6110	Right Exit Cam	43- 1
C209 6112	Left Adjusting Lever	43- 29
C209 6113	Right Adjusting Lever	43- 5
C209 6114	Tension Spring	43- 3
C209 6115	Left Adjusting Lever Spring	43- 30
C209 6116	Right Adjusting Lever Spring	43- 4
C209 6126	Stud - M4	45- 30
C209 6136	Magnet Plate	45- 19
C209 6137	Magnet Catch Cover	45- 37
C209 6141	Guide Fence Rail	45- 26
C209 6142	Guide Fence Slider	45- 16
C209 6142	Guide Fence Slider	45- 27
C209 6143	Guide Fence Knob	45- 25
C209 6144	Guide Fence Shaft	45- 14
C209 6144	Guide Fence Shaft	45- 24
C209 6145	Guide Fence Bracket	45- 29
C209 6149	Guide Fence Spring	45- 28
C209 6150	End Fence Spring	45- 17
C209 6151	End Fence Support Rail	45- 15
C209 6153	Bracket - Support End Fence	45- 18
C209 6156	Sponge Seal - 4.5x65x175	45- 2
C209 6157	End Fence Shaft	45- 3
C209 6158	End Fence Bracket	45- 6
C209 6159	End Fence Spring - Large	45- 5
C209 6160	End Fence Base	45- 4
C209 6161	Left Rail - End Fence (A4)	45- 12
C209 6162	Right Rail - End Fence (A4)	45- 7
C209 6163	Spacer - 10x18x1	45- 8

Part No.	Description	Page and Index No
C209 6164	Rail Spring - End Fence	45- 9
C209 6168	End Fence Washer	45- 10
C209 6175	Stud - M4	43- 16
C209 6176	Delivery Table Angle	43- 15
C209 6177	Stud - M4x11	43- 12
C209 6178	Spacer 8x20x2	43- 14
C209 6179	Spacer - 4x18x2	43- 11
C209 6180	Spring Washer - M8	43- 13
C209 6181	Front Guide Plate	45- 22
C209 6182	Rear Guide Fence	45- 23
C209 6183	Small End Fence	45- 13
C209 6184	End Fence	45- 1
C209 6188	Sensor Actuator - Delivery Table	43- 24
C209 6193	Lock Arm - Delivery Table Sensor	43- 28
C209 6196	Actuator Link - Delivery Table	43- 25
C209 6203	Air Piston Ass'y	47- 12
C209 6204	Gear - 18/48Z	47- 16
C209 6206	Gear Shaft	47- 17
C209 6207	Gear - 75Z	47- 13
C209 6210	Air Pump Drive Shaft	47- 14
C209 6211	Piston Link	47- 11
C209 6213	Piston Pin - Air Pump	47- 10
C209 6215	Piston Valve	47- 7
C209 6216	O-Ring - 34	47- 8
C209 6219	Air Hose	47- 1
C209 6223	Exit Pawl Bracket	47- 20
C209 6225	Hose Clamp	47- 23
C209 6230	Exit Pawl Holder	47- 19
C209 6231	Knob Screw - M4	47- 18
C209 6232	Exit Pawl Shaft	47- 24
C209 6233	Exit Pawl	47- 22
C209 6240	Air Pump Cylinder	47- 4
C209 6241	Front Cylinder Bracket	47- 3
C209 6242	Rear Sylinder Bracket	47- 5
C209 8107	Brower Moter Harness	39- 10

Part No.	Description	Page and Index No.
C209 8117	Drum Master Detection Sensor	17- 12
C209 8117	Drum Master Detection Sensor	75- 11
C209 8137	Relay Harness - Ink Detection	57- 18
C209 8140	Grounding Wiar - 65mm	55- 4
C209 8169	Short Harness	55- 1
C209 8197	Paper Size Sensor Harness	23- 11
C209 8197	Paper Size Sensor Harness	25- 31
C209 8202	Commutation Brush	29- 3
C209 8204	Vacuum Fan Motor	39- 9
C209 8227	Ink Supply Solenoid	49- 8
C209 8234	Drum Lock Solenoid	35- 33
C209 8234	Drum Lock Solenoid	51- 6
C209 8239	Reverse Roller - Magnetic Clutch	73- 18
C209 8260	Micro Motor - Master Eject	75- 18
C209 8262	Release Solenoid	35- 12
C209 8262	Release Solenoid	35- 15
C209 8269	Master Eject Solenoid	75- 12
C209 8276	Main Switch	83- 2
C209 8278	LED - Drum	83- 5
C209 8280	Image Position Sensor	21- 6
C209 8288	Table Down Switch	27- 4
C210 2091	Harness Cover	17- 48
C210 2171	Safety Switch Bracket - Eject Box (230V)	81- 39
C210 2186	Right Cover Bracket	17- 35
C210 2804	Decal - Caution	97- 4
C210 2805	Decal - Paper Size (LT)	23- 6
C210 2805	Decal - Paper Size	97- 5
C210 2806	Decal - Paper Size (A4)	23- 6
C210 2806	Decal - Paper Size	97- 6
C210 2813	Decal - Replacing The Drum Unit	97- 7
C210 6253	Delivery Table (LT)	45- 20
C210 6254	Left Rail - End Fence (LT)	45- 12
C210 6255	Right Rail - End Fence (LT)	45- 7
C210 6262	Delivery Table (A4)	45- 20
C213 3561	Master Eject Sensor Bracket	75- 37

Part No.	Description	Page and Index No
C213 4810	Ink Antechamber	49- 20
C213 5110	Paper Feed Cam	21- 13
C215 4511	Dram Lock Lever	17- 14
C215 4514	Drun Lock Knob	17- 11
C215 4515	Drum Lock Link	17- 40
C215 4517	Connector Lock Arm	35- 39
C215 4532	Locking Arm	17- 34
C215 4533	Spring Plate	17- 33
C215 4537	Connector Lock Lever	35- 40
C215 4538	Slid Lock Arm	35- 37
C215 8116	Ink Detecting Board	35- 8
C216 2018	Transformer Bracket	17- 42
C216 8155	Transformer - 235V/105V	17- 41
C217 2453	Rear Cover Cap- Small	11- 26
C217 2454	Rear Cover Cap- Large	11- 27
C217 2455	Key Counter Cover	11- 8
C217 2514	Decal - Main Switch	11- 15
C217 2514	Decal - Main Switch	97- 8
C217 4426	Shoulder Screw	81- 41
C217 4598	Front Drum Blade	57- 25
C217 4599	Rear Drum Blade	57- 6
C217 5102	Spring Washer	11- 39
C217 5102	Spring Washer	59- 21
C217 8447	DC Motor - 24V/7.2W	75- 34
C218 2012	Rear Right Upper Bracket	81- 22
C218 2013	Rear Center Upper Bracket	81- 21
C218 2014	Rear Left Upper Bracket	81- 20
C218 2015	Rear Scanner Stopper Bracket	81- 16
C218 2022	Rear Cover Left Bracket	81- 18
C218 2024	Flat Cable Cover	17- 8
C218 2047	Lift Moter Cover	21- 1
C218 2051	Main Board Spacer	83- 9
C218 2052	Stud - Main Control Board	83- 22
C218 2070	Safety Switch Bracket - LT	81- 6
C218 2071	Safety Swtich Stopper - LT	81- 37

Part No.	Description	Page and Index No.
C218 2072	Safety Switch Cover - LT	81- 34
C218 2099	Transformer Cover	17- 43
C218 2120	Board Bracket	15- 8
C218 2160	Upper Lever	43- 22
C218 2164	2nd Left Side Plate	43- 23
C218 2171	Safety Switch Bracket - Eject Box (115V)	81- 39
C218 2172	Safety Switch Lever - LT	81- 36
C218 2172	Safety Switch Lever - LT	83- 27
C218 2173	Support Plate - Safety Switch - LT	81- 7
C218 2173	Support Plate - Safety Switch - LT	83- 28
C218 2185	Stepper Screw	83- 29
C218 2405	Lower Cover- Operation Panel	11- 18
C218 2423	Paper Feed Table Cover	23- 8
C218 2424	Front Door Ass'y (RIC)	11- 1
C218 2450	Right Cover	11- 32
C218 2456	Master Eject Cover	79- 10
C218 2460	Master Eject Cover	79- 9
C218 2500	Scanner Upper Cover	59- 11
C218 2507	Decal - Master Flange	69- 9
C218 2507	Decal - Master Flange	97- 9
C218 2515	Scanner Right Cover	59- 7
C218 2516	Decal - Original Scale - A4	59- 23
C218 2516	Decal - Original Scale - A4	97- 10
C218 2522	Cushion - Large	59- 2
C218 2524	Cushion - Small	59- 8
C218 2525	Stepped Screw - M4	11- 38
C218 2525	Stepped Screw - M4	59- 20
C218 2535	Scanner Left Cover	59- 1
C218 2560	Scanner Rear Cover	59- 5
C218 2750	Front Left Cover	11- 4
C218 2803	Left Front Cover - LT	11- 12
C218 2804	Lever Cover - Paper Feed - LT	27- 5
C218 2807	Platen Cover Ass'y	13- 0
C218 2809	Main Switch Cover	11- 16
C218 2816	Decal - Drum Replacement - LT	11- 2

Part No.	Description	Page and Index No
C218 2816	Decal - Drum Replacement - LT	97- 11
C218 2817	Decal - Replacement	11- 19
C218 2817	Decal - Replacement	97- 12
C218 2818	Decal - Paper Feed Pressure - LT	27- 7
C218 2818	Decal - Paper Feed Pressure - LT	97- 13
C218 2819	Decal - Paper Table Down (LT)	27- 6
C218 2819	Decal - Paper Table Down	97- 14
C218 2820	Decal - Original Size - LT	59- 23
C218 2820	Decal - Original Size - LT	97- 10
C218 2821	Decal Font Fixting	97- 15
C218 2822	Decal - Rear Fixting	97- 16
C218 2824	Decal - Original Table - LT	97- 17
C218 2825	Decal - Master Eject Open	11- 3
C218 2825	Decal - Master Eject Open	97- 18
C218 2827	Decal - Master Feed	67- 34
C218 2827	Decal - Master Feed	97- 19
C218 2832	Left Front Cover (A4)	11- 12
C218 2833	Lower Cover - Paper Feed (A4)	27- 5
C218 2841	Decal - Paper Table Down (A4)	27- 6
C218 2841	Decal - Paper Table Doun	97- 20
C218 2910	Caution Decal - French	97- 0
C218 2910	Caution Decal - French	97- 4
C218 2911	Caution Decal - Spanish	97- 0
C218 2911	Caution Decal - Spanish	97- 4
C218 2912	Caution Decal - Italian	97- 0
C218 2912	Caution Decal - Italian	97- 4
C218 2913	Caution Decal - German	97- 0
C218 2913	Caution Decal - German	97- 4
C218 2954	Front Door Ass'y (AB DICK)	11- 1
C218 3003	Seal - 28x40	65- 25
C218 3017	Scanner Grip Rail	63- 29
C218 3018	Seal - 40x131	59- 22
C218 3020	Stopper Pin	65- 16
C218 3021	Support Plate	65- 29
C218 3022	Scanner Stopper Shaft	65- 30

Part No.	Description	Page and Index No.
C218 3024	Scanner Front Stay	65- 23
C218 3025	Contact Grass Cushion	65- 8
C218 3028	Scanner Rear Stay	65- 7
C218 3031	Stud	65- 10
C218 3034	H.P Sensor Bracket	59- 14
C218 3036	H.P Sensor Cover	59- 13
C218 3037	Flat Cable Cover	59- 10
C218 3039	Flat Cable Clamp	17- 9
C218 3039	Flat Cable Clamp	61- 9
C218 3041	Right Bracket	59- 6
C218 3043	Lens Base Plate	61- 20
C218 3044	Cover Cushion	59- 24
C218 3045	Guide Mylar	59- 9
C218 3046	Original Exit Guide	59- 3
C218 3051	Philips Screw - M3	27- 45
C218 3051	Philips Screw - M3	63- 38
C218 3053	Arm - Carriage - Fix - Front	63- 4
C218 3053	Arm - Carriage - Fix - Front	63- 35
C218 3054	Pad - 5x5	63- 5
C218 3055	Front Fixed Angle	63- 6
C218 3056	Fixed Shaft Bracket	63- 3
C218 3057	Fixed Shaft	63- 2
C218 3059	Rear Fixed Arm	63- 7
C218 3059	Rear Fixed Arm	63- 36
C218 3060	Rear Fixed Angle	63- 1
C218 3062	Timing Pulley - Scanner Motor	63- 34
C218 3063	Scanner Drive Pulley	63- 22
C218 3065	Pulley - 22/56Z	63- 11
C218 3066	Pulley - 49Z	63- 19
C218 3068	Timing Pulley - 48Z	63- 25
C218 3069	Timing Pulley - 24Z	63- 23
C218 3072	Timing Belt - B40S2M160	63- 12
C218 3073	Timing Belt - B60S2M126	63- 13
C218 3073	Timing Belt - B60S2M126	81- 35
C218 3074	Timing Belt - B40S2M1274	63- 21

Part No.	Description	Page and Index No
C218 3075	Timing Belt - B40S2M800	63- 20
C218 3078	Scanner Motor Bracket	63- 14
C218 3081	Tension Bracket	63- 8
C218 3082	Tension Spring	63- 10
C218 3083	Tension Spring	63- 15
C218 3086	Motor Cushion	63- 9
C218 3090	Scanner Drive Shaft	63- 33
C218 3091	Timing Pulley Bracket - Front 1	63- 37
C218 3094	Tension Spring	63- 26
C218 3096	Timing Pulley Bracket - Rear 1	63- 28
C218 3099	Timing Pulley Bracket - Front 2	63- 32
C218 3103	Timing Pulley Bracket - Rear 2	63- 27
C218 3110	Scanner Grip Upper Cover	65- 22
C218 3111	Scanner Grip Shaft	65- 20
C218 3112	Scanner Stopper	65- 15
C218 3116	Stopper Spring 1	65- 14
C218 3117	Stopper Spring 2	65- 13
C218 3118	Scanner Stopper Bracket	65- 12
C218 3123	Slide Rail	15- 2
C218 3124	Spacer	15- 1
C218 3125	Scanner Open Actuater	15- 26
C218 3127	Slide Rtail Right Bracket	15- 19
C218 3130	Slide Rail Seal	15- 29
C218 3131	Slide Rail Left Bracket	15- 18
C218 3133	Scanner Base Cushion 1	15- 25
C218 3134	Scanner Base Cushion 2	15- 24
C218 3135	Spacer Cushion	15- 23
C218 3138	Stopper Seal	15- 28
C218 3154	Exposuer Glass (LT)	59- 18
C218 3157	Original Scale - LT	59- 16
C218 3166	Exposure Glass (A4)	59- 18
C218 3171	Seal - 5x30	59- 12
C218 3190	Spring Plate	61- 12
C218 3191	1st Mirror	61- 11
C218 3193	Timing Belt Clamp	61- 5

Part No.	Description	Page and Index No.
C218 3205	Original Scale - A4	59- 16
C218 3206	2nd And 3rd Mirror	61- 2
C218 3207	Rear Spring Plate	61- 4
C218 3208	Front Spring Plate	61- 3
C218 3211	Lens Holder	61- 27
C218 3212	Adjusting Pin	61- 23
C218 3213	Adjusting Ball	61- 15
C218 3214	Lens Bracket	61- 26
C218 3223	Adjusting Spring Plate	61- 19
C218 3224	Rear Adjust Spring	61- 28
C218 3225	Front Adjust Spring	61- 25
C218 3226	Shading Plate	61- 21
C218 3426	Platen Cover Right Bracket	65- 4
C218 3430	Knob Screw	65- 2
C218 3431	Platen Cover Shaft	65- 3
C218 3434	Sensor Bracket	65- 6
C218 3438	Platen Cover Left Bracket	65- 1
C218 3446	Magnet Catch Plate	59- 19
C218 3505	Hinge Shaft	79- 1
C218 3506	Boss	79- 15
C218 3532	Pulley Guide	77- 10
C218 4038	Bushing Washer - M8	67- 24
C218 4060	Platen Release Lever	67- 32
C218 4065	Cutter Unit	69- 1
C218 4126	Right Connector Bracket	67- 26
C218 4136	Spring Plate	67- 8
C218 4230	Master Flange	69- 8
C218 4230	Master Flange	85- 1
C218 4502	Drum Rail Stay	17- 17
C218 4528	Plate Spring - Drum Rail	17- 18
C218 4535	Drum Connector Bracket	35- 41
C218 4536	Ink Detecting Board Bracket	35- 34
C218 4539	Connector Spring	35- 35
C218 4565	Rear Drum Flange	55- 14
C218 4592	Front Bank Plate	57- 21

Part No.	Description	Page and Index No
C218 4594	Rear Bank Plate	57- 8
C218 4612	Rear Roller Guide	53- 1
C218 4683	Screen Rear Plate	55- 22
C218 4698	Ink Distributor & Tube Ass'y	57- 13
C218 4701	Ink Tube nipple	57- 11
C218 4936	Drum Clamper Ass'y	55- 21
C218 4945	Drum Clamper Base Ass'y	55- 17
C218 5016	Front Side Plate	31- 10
C218 5054	Table Position Knob	25- 18
C218 5094	Insulating Sheet	83- 20
C218 5151	Cassette Body - Large	87- 14
C218 5164	Cassette Body - Small	87- 22
C218 5171	Magnet Holder	87- 16
C218 5180	Decal - Paper Size - Large	87- 20
C218 5181	Decal - Paper Size - Small	87- 9
C218 5182	Decal - Magnet - Large	87- 17
C218 5183	Decal - Magnet - Small	87- 23
C218 5526	Spring	37- 19
C218 5554	Press Roller Ass'y	37- 14
C218 5555	Transfer Roller	37- 4
C218 6119	Delivery Table Cover	45- 21
C218 8132	Original Sensor Harness	61- 8
C218 8153	Scanner Flat Cable	61- 13
C218 8181	Transformer - 115V	17- 41
C218 8200	Main Motor - DC90V 108W	29- 2
C218 8242	Power Supply Cord - 115V	81- 4
C218 8252	Power Supply Cord - 230V	81- 4
C218 8407	Photointerruptor - GP1A34LC	59- 15
C218 8424	Original Sensor	61- 7
C218 8426	Grounding Harness	63- 17
C218 8430	Decal - Newtral	97- 21
C219 2073	Stopper Stud - Paper Feed	35- 17
C219 2075	Feed Gear Stopper Shaft	21- 23
C219 2075	Feed Gear Stopper Shaft	35- 18
C219 2104	Right Grip - Master Eject	81- 3

Part No.	Description	Page and Index No.
C219 2106	Left Grip - Paper Delivery	15- 4
C219 2109	Key Counter Bracket	43- 31
C219 2111	Shaft	15- 13
C219 2112	Harness Satay	15- 35
C219 2150	Rear Right Grip	15- 22
C219 2152	Rear Cover Bracket	15- 30
C219 2205	Bracket - Drum Rotation Sensor	29- 20
C219 2217	Collar	19- 22
C219 2226	Gear - 22Z	21- 18
C219 2306	Drum Sensor Bracket	29- 21
C219 2306	Drum Sensor Bracket	37- 20
C219 2315	Tension Shaft	19- 15
C219 2418	Push Switch Bracket	83- 7
C219 2419	Safety Switch Bracket	83- 19
C219 2428	Switch Plate - Paper Feed Table	17- 24
C219 2440	Lower Harness Cover	17- 44
C219 2441	Upper Harness Cover	17- 45
C219 2454	Master Eject Cover	79- 17
C219 2702	Front Platen Cover	13- 3
C219 2704	Rear Platen Cover	13- 2
C219 2705	Original Holder	11- 33
C219 2705	Original Holder	13- 1
C219 2706	Platen Cover Sensor Actuator	13- 7
C219 2708	Platen Cover Sheet	13- 9
C219 2710	Platen Cover Hinge	13- 6
C219 2711	Hinge Stopper	13- 10
C219 3473	Interface Cover	13- 8
C219 3545	Upper Belt	75- 28
C219 3546	Lower Belt	75- 29
C219 3673	Inner Cover - Master Eject	79- 14
C219 3680	Master Eject Hinge - Small	79- 3
C219 3768	Upper Inner Cover	79- 5
C219 3950	Stepped Screw	43- 19
C219 4023	Seal	67- 16
C219 4071	Gear - 17Z	69- 11

Part No.	Description	Page and Index No
C219 4505	Drum Stopper Ass'y	17- 1
C219 4506	Stopper Base	17- 5
C219 4648	Front Drum Flange	53- 13
C219 4678	Front Drum Flange cover	53- 14
C219 4679	Rear Seald - Drum Flange	55- 13
C219 5026	Pick-up Roller Shaft	27- 36
C219 5033	Paper Feed Roller	27- 35
C219 5066	Paper Feed Table Ass'y - LT	23- 3
C219 5067	Paper Feed Table Ass'y - A4	23- 3
C219 5073	Stepped Screw	23- 5
C219 5076	Paper Table	25- 16
C219 5079	Supporter	25- 27
C219 5081	Sensor Bracket	25- 36
C219 5101	Sector Gear	35- 27
C219 5105	Sector Gear Stopper	35- 30
C219 5106	Sector Gear Stopper	21- 27
C219 5108	Sector Stopper - Feed Roller	35- 21
C219 5109	Feed Sector Stopper	35- 20
C219 5120	Feed Cam Shaft	21- 11
C219 5122	Paper Feed Sector Cam	35- 25
C219 5127	Sector Gear Shaft	35- 23
C219 6080	Adjusting Lever Shaft	39- 6
C219 6084	Antistatic Brush	43- 9
C219 8021	Paper Detection Board	23- 7
C219 8113	Harness - Paper Detection Board	23- 9
C219 8146	Harness Head Power	67- 17
C219 8171	Microswitch	83- 4
C219 8174	Microswitch	81- 8
C219 8250	Lift Motor - DC 1.69W 0.2A	21- 2
C219 8296	Safety Switch	81- 19
C219 8296	Safety Switch	83- 25
C221 2004	Switch Bracket (A4)	81- 6
C221 2028	Switch Cover Bracket	81- 34
C221 2124	Cap	81- 24
C221 2128	Support Bracket	81- 25

Part No.	Description	Page and Index No.
C221 2573	Lower Pad - Rear Cover	11- 31
C221 2575	Large Pad - Rear Cover	11- 28
C221 3519	Roller Arm	75- 24
C221 3537	Pressure Spring	77- 4
C221 4070	Gear Cover	69- 13
C221 5570	Adjusting Plate - Exit Pawl	37- 10
C221 5573	Pressure On/off Lever	37- 3
C221 6002	Vacuum Base	39- 8
C221 6002	Vacuum Base	41- 14
C221 6037	Right Support Plate	41- 11
C221 6038	Left Support Plate	41- 13
C221 6048	Small Arm	41- 15
C221 6051	Support Arm	41- 8
C221 6081	Paper Delivery Plate	43- 10
C221 6115	Delivery Table Bracket	81- 26
C221 6118	Adjusting Lever Shaft	43- 6
C221 6127	Support Plate - Left Stay	45- 35
C221 6128	Support Plate - Right Stay	45- 34
C221 6130	Left Stay - Delivery Table	45- 33
C221 6131	Right Stay - Delivery Table	45- 32
C222 2001	Left Side Plate	15- 3
C222 2002	Right Side Plate	15- 21
C222 2020	Scanner Stopper	81- 15
C222 2062	Left Grip Cover	15- 7
C222 2071	Bottom Stay	15- 11
C222 2072	Bottom Stay	15- 17
C222 2089	Side Plate Bracket	15- 33
C222 2092	Seal	15- 34
C222 2095	Bottom Cover - Delivery Table	15- 32
C222 2098	Bottom Cover	15- 9
C222 2120	Left Bracket - Operation Panel	11- 35
C222 2121	Middle Bracket - Operation Panel	11- 36
C222 2122	Right Bracket - Operation Panel	11- 37
C222 2429	Support Cover - Paper Feed Cover	17- 29
C222 2552	Decal - Master Set	11- 34

Part No.	Description	Page and Index No
C222 2552	Decal - Master Set	97- 22
C222 2553	Caution Decal - Master Set	73- 8
C222 2553	Caution Decal - Master Set	97- 23
C222 2554	Decal - Mode	97- 24
C222 2565	Multi Decal - Master Set - German	97- 22
C222 2566	Multi Decal - Master Set - French	97- 22
C222 2567	Multi Decal - Master Set - Italian	97- 22
C222 2568	Multi Decal - Master Set - Spanish	97- 22
C222 2811	Rear Upper Cover	11- 20
C222 2860	Front Cover Ass'y (NRG)(SVN)	11- 14
C222 2862	Front Door Ass'y (NRG)	11- 1
C222 3016	Scanner Grip Cover	65- 21
C222 3019	Scanner Harness Cover	61- 33
C222 3120	Spacer	61- 32
C222 3136	Scanner Rail Stopper	15- 27
C222 3150	1st Mirror Bracket	61- 10
C222 3169	Harness Bracket	61- 17
C222 3170	Exposure Glass Sheet	59- 17
C222 3175	Scanner Slider	25- 38
C222 3175	Scanner Slider	61- 6
C222 3178	Fluorescent Lamp Harness Bracket	61- 14
C222 3179	Harness Clip	61- 34
C222 3185	Mirror Bracket - 2nd/3rd	61- 1
C222 3193	Bushing - 8mm	63- 31
C222 3200	Fluorescent Lamp Harness	61- 16
C222 3232	CCD Board Cover	61- 30
C222 3234	Grounding Plate (230V)	61- 35
C222 3235	Grounding Plate	65- 26
C222 4336	Duct Cover	73- 25
C222 4670	Ink Pump (RIC)(NRG)(SVN)	49- 16
C222 4680	Ink Pump (AB DICK)	49- 16
C222 5020	Separation Roller Shaft	29- 7
C222 5121	Position Indicator	25- 33
C222 5216	Rubber Plate - Guide Plate	33- 16
C222 5254	Solenoid Support Bracket	37- 25

Part No.	Description	Page and Index No.
C222 5275	Tension Spring	37- 26
C222 5512	Tension Spring	35- 44
C222 5518	Paper Release Lever	35- 43
C222 5519	Release Lever Shaft	35- 42
C222 5520	Solenoid Bracket	35- 45
C222 5525	Solenoid Cover	35- 47
C222 6101	Delivery Table Unit (LT)	45- 0
C222 6265	Delivery Table Unit (A4)	45- 0
C222 8008	IC - KG9F003024C	93- 3
C222 8012	A/D Converter Board	61- 31
C222 8028	Thermal Head Drive Board	67- 13
C222 8127	Plotter Unit Harness	83- 10
C222 8128	Thermal Head Harness	73- 6
C222 8129	Sensor Relay Harness	73- 22
C222 8157	Thermal Head Harness	83- 15
C222 8160	Thermal Head Drive Harness	73- 26
C222 8163	Thermal Head Harness - 2	67- 14
C222 8164	Thermal Head Harness - 1	67- 15
C222 8208	Air Knife Motor	73- 23
C222 8208	Air Knife Motor	79- 12
C222 8216	Stepper Motor - DC2.85V 4.28W	69- 10
C222 8220	Fluorescent Lamp	61- 18
C222 8221	Inverter	63- 30
C222 8234	Paper Release Solenoid	35- 46
C222 8236	Press Roller Solenoid	37- 22
C222 8301	Power Supply Unit	43- 7
C222 8415	Scanner Harness	65- 9
C223 2029	Scanner Stopper Unit	17- 38
C223 2036	Scanner Stopper Bracket	17- 15
C223 2037	Cushion 1	17- 16
C223 2038	Cushion 2	17- 22
C223 2039	Stopper Bracket	17- 31
C223 2040	Stopper Seal 1	17- 32
C223 2041	Stopper Seal 2	17- 36
C223 2042	Stopper Seal 3	17- 39

Part No.	Description	Page and Index No
C223 2043	Stopper Seal	17- 37
C223 2052	Left Fixing Bracket	17- 7
C223 2054	IPU Board Stud	83- 24
C223 2082	Solenoid Bracket	35- 7
C223 2085	Paper Table Lower Cover	15- 31
C223 2217	Gear - 50Z	19- 6
C223 2229	Feed Cam Gear	21- 15
C223 2309	Support Plate	19- 26
C223 2452	Decal - Paper Table Knob	97- 25
C223 2453	Decal - Paper Level	23- 13
C223 2453	Decal - Paper Level	97- 26
C223 2551	Base Pad - Front	85- 2
C223 2553	Base Pad - Rear	85- 3
C223 2586	Lower Plotter Cover	67- 19
C223 2587	Plotter Cover Pad	67- 20
C223 2599	Plotter Base Pad - Large	67- 11
C223 2801	Operation Panel Ass'y (LT)	11- 17
C223 2810	Front Cover Ass'y (RIC)	11- 14
C223 2812	Rear Cover Ass'y	11- 25
C223 2831	Operation Panel Ass'y (A4)	11- 17
C223 2865	Model Name Plate - GES	11- 6
C223 2866	Model Name Plate - REX	11- 6
C223 2867	Model Name Plate - NSA	11- 6
C223 2910	Front Cover Ass'y (AB DICK)	11- 14
C223 2921	Front Door Ass'y (SVN)	11- 1
C223 3014	Scanner Stopper Lever	65- 11
C223 3024	Contact Glass Sheet	65- 27
C223 3108	Scanner Open Grip	65- 18
C223 3109	Grip Bracket	65- 19
C223 3119	Scanner Open Cover	65- 28
C223 3215	CCD Bracket	61- 22
C223 3233	CCD Board Bracket	61- 36
C223 4005	Plotter Left Side Plate	67- 10
C223 4010	Plotter Right Side Plate	67- 27
C223 4030	Thermal Head Stay	67- 5

Part No.	Description	Page and Index No.
C223 4034	Spring	67- 7
C223 4035	Spacer	67- 4
C223 4037	Thermal Head Guide Plate	67- 2
C223 4038	Master Guide - Large	71- 17
C223 4047	Platen Roller	69- 5
C223 4054	Thermal Head Cover	67- 25
C223 4068	Front Guide Plate	71- 12
C223 4088	Lower Guide Plate	71- 18
C223 4111	Pulley - 38	69- 2
C223 4112	Timing Belt	69- 3
C223 4125	Left Connector Bracket	73- 7
C223 4133	Plotter Base	67- 18
C223 4175	Thermal Head Positioning Pin	69- 12
C223 4179	Left Holder - Platen Cover	69- 4
C223 4184	Right Holder - Platen Cover	69- 6
C223 4306	Invertor Guide Stay	73- 9
C223 4328	Duct Stay	73- 24
C223 4331	Duct Suppor Plate	73- 20
C223 4392	Solenoid Bracket	35- 48
C223 4395	Right Cushion	35- 49
C223 4396	Left Cushion	35- 50
C223 4398	Lever Cushion	35- 5
C223 4552	Master Exit Lever	35- 28
C223 4553	Master Release Lever	35- 3
C223 4555	Cushion	35- 51
C223 4801	Metal Screen - DLT	53- 12
C223 4836	Tetron Screen - DLT	55- 18
C223 5015	Lower Reverse Roller	29- 8
C223 5030	Lower Spring	29- 6
C223 5050	Paper Guide Rack	25- 24
C223 5055	Paper Table Arm	25- 30
C223 5073	Paper Table Fixing Bracket	25- 1
C223 5082	Left Side Plate	25- 8
C223 5085	Right Side Plate	25- 10
C223 5090	Motor Bracket	81- 27

Part No.	Description	Page and Index No
C223 5091	Gear Shaft	81- 28
C223 5092	Lifting Gear Cover	81- 23
C223 5093	Lift Motor Bracket	81- 13
C223 5095	Worm Wheel	81- 29
C223 5096	Lift Gear	29- 22
C223 5097	Worm Wheel	81- 12
C223 5098	Support Gear Bracket	81- 30
C223 5099	Worm Gear Shaft	81- 31
C223 5120	Feed Cam - DLT	21- 14
C223 5123	Front Shaft - Paper Feed	25- 29
C223 5124	Stepped Screw - M8.2	25- 32
C223 5126	Timing Pulley	81- 32
C223 5128	Left Rack - Paper Feed	25- 14
C223 5133	Paper Lift Shaft	29- 18
C223 5215	Lower Guide Plate	33- 15
C223 5336	Paper Feed Slider	25- 22
C223 5350	Upper Paper Guide	27- 43
C223 5355	Paper Guide Slider	27- 44
C223 5360	Lower Paper Guide	27- 46
C223 5365	Left Guide Plate	27- 47
C223 5366	Right Guide Plate	27- 48
C223 5521	Left Pressure Arm	37- 7
C223 5525	Right Pressure Arm	37- 9
C223 5528	Pressure Stay	37- 8
C223 5529	Support Stay	37- 5
C223 5549	Rear Guide Plate	37- 6
C223 5560	Pressure Roller Cam - DLT	19- 10
C223 5564	Sheet Bracket	37- 28
C223 5573	Drive Arm	37- 24
C223 5574	Solenoid Bracket	37- 23
C223 5603	Pressure Shaft - A3	37- 13
C223 6004	Stripper Pawl Cam	37- 11
C223 6183	End Plate	85- 4
C223 8004	UVEPROM 256K X8 150NS	83- 14
C223 8005	UVEPROM 256K X8 150NS	83- 12

Part No.	Description	Page and Index No.
C223 8006	UVEPROM 256K X8 150NS	83- 13
C223 8016	Image Processing Board	83- 11
C223 8017	IPU Board	93- 0
C223 8037	Thermal Head - A3	67- 1
C223 8042	Main Control Board	83- 23
C223 8042	Main Control Board	89- 0
C223 8045	UVEPROM 512KX8 150NS	83- 8
C223 8045	UVEPROM 512K X8 150NS	89- 1
C223 8047	UVEPROM 512K X8 150NS	83- 26
C223 8047	UVEPROM 512K X8 150NS	89- 2
C223 8058	AC Drive Board - 120V	81- 10
C223 8058	AC Drive Board - 120V	91- 0
C223 8064	AC Drive Board - 230V	81- 10
C223 8064	AC Drive Board - 230V	91- 0
C223 8072	CCD Board	61- 24
C223 8090	IC - MN56030RTE	93- 4
C223 8091	IC - UPD65622GF-184-3	93- 5
C223 8092	IC - MBCG24692-4432	93- 6
C223 8111	DC Drive Harness - 120V	15- 15
C223 8111	DC Drive Harness (115V)	83- 16
C223 8119	Drum Harness	35- 9
C223 8122	Master Exit Harness	75- 7
C223 8123	AC Drive Harness - 120V	15- 14
C223 8208	DC Drive Harness - 230V	15- 15
C223 8208	DC Drive Harness (230V)	83- 16
C223 8213	DC Motor	81- 11
C223 8214	Stepping Motor	63- 16
C223 8223	AC Drive Harness - 230V	15- 14
C223 8224	DC Solenoid Ass'y	35- 6
C223 8294	Safety Switch	17- 27
C223 8295	Safety Switch Relay Harness	17- 26
C223 8600	Operating Instructions - English A4 (RIC)	97- 0
C223 8607	Operating Instructions - English LT (RIC)	97- 0
C223 8608	Operating Instructions - English ASIA	97- 0
C223 8647	Operating Instructions - English (AB DICK)	97- 0

Part No.	Description	Page and Index No
C223 8650	Operating Instructions - English (SVN)	97- 0
C223 8690	Operating Instructions - English A4 (NRG)	97- 0
C223 8697	Operating Instructions - English LT (NRG)	97- 0
C225 2866	Decal Key-top Cover (REX)	11- 24
C225 2867	Decal Key-top Cover (NSA)	11- 24
C522 2417	Cover Stopper Supporter	87- 2
C522 2423	Cushion Seal - 10x19	87- 7
C522 2431	Side Fence	87- 6
C522 2432	Rear Fence	87- 18
C522 2433	Plate Nut	87- 13
C522 2434	Grounding Plate	87- 11
C522 2435	Screw - M3	87- 15
C525 2031	Door Hinge	95- 3
C525 2032	Door Catch	95- 4
C525 2038	Caster	95- 7
C525 2039	Caster Stopper	95- 6
C526 2113	Decal - Drum Set	95- 10
C526 2150	Drum Decal - Black	95- 11
C526 2151	Drum Decal - Red	95- 11
C526 2152	Drum Decal - Blue	95- 11
C526 2153	Drum Decal - Green	95- 11
C526 2154	Drum Decal - Brown	95- 11
C526 2202	Option Drum Case	95- 8
C526 8172	Relay Harness (Option Drum)	55- 2
C530 5012	Cassette Cover - Large	87- 3
C546 2020	Left Door	95- 1
C546 2025	Right Door	95- 5
C546 2030	Door Grip	95- 2
C546 2035	Adjusting Screw	95- 9
H002 2226	Bushing	73- 13
H012 1181	Bushing- 6mm	73- 4
H012 1181	Bushing- 6mm	73- 15

Part No.	Description	Page and Index No.
A012 5226	IC - TC19G060AF0027	93- 1
A030 1339	Plate Nut - Key Counter	11- 10
A037 5222	IC - TC23SC100AF	93- 2
A153 6409	Decal Key-top Cover (GES)	11- 24
5053 0223	Bushing - 8mm	47- 21
5053 0419	Bushing - 10mm	27- 38
5054 0536	Magnet Catch Ass'y	51- 8
5054 0536	Magnet Catch Ass'y	67- 23
5056 0188	Bushing - 6mm - Long	71- 4
5056 0509	Nut Plate - Microswitch	83- 3
5070 0923	Spring Washer - Rotating Table	25- 3
5203 5230	Master Sensor	67- 30
5205 2680	Coupled Gear - 16T/53T	21- 5
5205 2681	Coupled Gear - 17T/50T	21- 4
5206 2684	Shoulder Screw - M3	27- 33
5290 5012	Cassette Cover - Small	87- 19
5309 1023	Pinion Paper Feed Table	25- 26
5324 1658	Bushing- 4x8x4.5mm	73- 11
5400 3404	Stepped Screw	51- 17
5403 2048	Bushing - 4mm	17- 25
5403 2075	Stepped Screw	29- 24
5403 2075	Stepped Screw	35- 38
5403 2075	Stepped Screw	71- 5
5403 2075	Stepped Screw	75- 17
5403 6246	Stepped Screw - Cleaning	35- 22
5413 1882	Stepped Screw	49- 1
5413 2274	Spring Aunchor - Release Lever	55- 11
5447 2681	Snap Ring	63- 24
5448 2824	Flex Hinge - Platen Cover	13- 4
5501 4719	Rubber Ring - Stopper	17- 19
5501 7559	Spring - Master Feed	35- 10
5501 7559	Spring - Master Feed	43- 26
5501 8180	Flat Spring - Feed Roller Pressure	27- 3
5501 8328	Spring - Feed Roller Brake	33- 18
5505 3598	Spring - Ratch - Control Section	49- 9

Part No.	Description	Page and Index No
5505 6528	Spring - Press Roller	33- 11
5505 7197	Spring - Hinge - Inking	25- 25
5506 1536	Screw - M4X6	25- 2
5506 4169	Rubber Roller - Paper Feed	27- 29
5506 4235	Plate Nut - Paper Pressure	27- 9
5506 4608	Bushing - Paper Hold/down Roller -	75- 23
5506 6069	Step Screw - Etching Middle Roller	55- 6
5506 6111	Stepped Screw - M4	53- 8
5506 6197	Screw - Knife Cam - Leading Edge CL	43- 8
5506 6197	Screw - Knife Cam - Leading Edge CL	45- 31
5506 6314	Mylar - Master Feed Table	25- 9
5507 6032	Timing Belt Pulley - 30T	27- 31
5507 6035	Timing Belt - 162XL	27- 34
5507 6060	Guide Screw - Front Plate	31- 8
5507 6624	Bushing - 8x16x45mm	49- 6
5507 6828	Rubber Plate - Feed Table	23- 1
5507 6828	Rubber Plate - Feed Table	87- 8
5600 1080	Bush - Paper Feed Roller - Left	33- 26
5600 1081	Right Bushing - Paper Feed Roller	27- 42
5600 1086	Spacer - 10.2 X 20	27- 28
5600 1107	Snap Retainer - 12	25- 17
5600 1107	Snap Retainer - 12	27-116
5600 1379	Spring	51- 16
5603 1045	Screw - M5	43- 32
5603 1045	Screw - M5	45- 11
5606 2066	Paper Feed Guide Disc	27- 27
5606 2310	Roller	25- 13
5607 2814	Roller Spring	37- 12
5607 3927	Stepped Screw - M3x8	45- 36
5875 2088	Shoulder Screw - M4	59- 4
5875 2088	Shoulder Screw - M4	65- 24

Part No.	Description	Page and Index No.
0252 0080Z	Philips Pan Head Screw - M2x8	17-102
0312 5050Z	Philips Pan Head Screw - M2.5x5	71-102
0313 0030Z	Philips Pan Head Screw - M3x3	75-101
0313 0030Z	Philips Pan Head Screw - M3x3	75-111
0313 0040B	Philips Pan Head Screw - M3x4	21-100
0313 0040Z	Philips Pan Head Screw - M3x4	35-107
0313 0040Z	Philips Pan Head Screw - M3x4	41-108
0313 0040Z	Philips Pan Head Screw - M3x4	43-102
0313 0040Z	Philips Pan Head Screw - M3x4	49-101
0313 0040Z	Philips Pan Head Screw - M3x4	57-106
0313 0040Z	Philips Pan Head Screw - M3x4	67-100
0313 0050W	Philips Pan Head Screw - M3x5	13-102
0313 0050W	Philips Pan Head Screw - M3x5	31-103
0313 0050Z	Philips Screw - 3x5	29-109
0313 0050Z	Philips Screw - 3x5	33-108
0313 0050Z	Philips Screw - 3x5	57-117
0313 0050Z	Philips Screw - 3x5	63-102
0313 0050Z	Philips Screw - 3x5	67-102
0313 0050Z	Philips Screw - 3x5	71-105
0313 0050Z	Philips Screw - 3x5	73-105
0313 0050Z	Philips Pan Head Screw - M3x5	75-106
0313 0060Z	Philips Pan Head Screw - M3x6	37-112
0313 0060Z	Philips Pan Head Screw - M3x6	45-104
0313 0060Z	Philips Pan Head Screw - M3x6	47-110
0313 0060Z	Philips Pan Head Screw - M3x6	59-105
0313 0060Z	Philips Pan Head Screw - M3x6	61-101
0313 0060Z	Philips Pan Head Screw - M3x6	65-102
0313 0060Z	Philips Pan Head Screw - M3x6	67-101
0313 0060Z	Philips Pan Head Screw - M3x6	71-101
0313 0060Z	Philips Pan Head Screw - M3x6	73-100
0313 0060Z	Philips Pan Head Screw - M3x6	81-109
0313 0060Z	Philips Pan Head Screw - M3x6	83-100
0313 0080Z	Philips Screw - 3x8	73-111
0313 0100Z	Philips Pan Head Screw - M3x10	23-108
0313 0100Z	Philips Pan Head Screw - M3x10	41-103

Part No.	Description	Page and Index No
0313 0120Z	Philips Screw - 3x12	17-110
0313 0140Z	Philips Pan Head Screw - M3x14	77-109
0313 0140Z	Philips Pan Head Screw - M3x14	83-103
0313 0350Z	Pan Head Screw - M3x35	73-109
0313 0350Z	Pan Head Screw - M3x35	79-107
0314 0050Z	Philips Pan Head Screw - M4x5	47-109
0314 0050Z	Philips Pan Head Screw - M4x5	75-104
0314 0060W	Philips Pan Head Screw - M4x6	13-101
0314 0060Z	Philips Pan Head Screw - M4x6	15-100
0314 0060Z	Philips Pan Head Screw - M4x6	17-108
0314 0060Z	Philips Pan Head Screw - M4x6	21-124
0314 0060Z	Philips Pan Head Screw - M4x6	27-111
0314 0060Z	Philips Pan Head Screw - M4x6	49-113
0314 0060Z	Philips Pan Head Screw - M4x6	51-105
0314 0060Z	Philips Pan Head Screw - M4x6	57-114
0314 0060Z	Philips Pan Head Screw - M4x6	59-101
0314 0060Z	Philips Pan Head Screw - M4x6	61-102
0314 0060Z	Philips Pan Head Screw - M4x6	65-101
0314 0060Z	Philips Pan Head Screw - M4x6	67-103
0314 0060Z	Philips Pan Head Screw - M4x6	69-101
0314 0060Z	Philips Pan Head Screw - M4x6	77-110
0314 0060Z	Philips Pan Head Screw - M4x6	79-108
0314 0060Z	Philips Pan Head Screw - M4x6	81-108
0314 0080Z	Philips Screw - 4x8	15-101
0314 0080Z	Philips Screw - 4x8	17-107
0314 0080Z	Philips Screw - 4x8	21-103
0314 0080Z	Philips Screw - 4x8	25-102
0314 0080Z	Philips Screw - 4x8	27-105
0314 0080Z	Philips Screw - 4x8	29-113
0314 0080Z	Philips Screw - 4x8	33-102
0314 0080Z	Philips Screw - 4x8	41-109
0314 0080Z	Philips Screw - 4x8	43-103
0314 0080Z	Philips Screw - 4x8	47-100
0314 0080Z	Philips Screw - 4x8	55-100
0314 0080Z	Philips Screw - 4x8	57-103

Part No.	Description	Page and Index No.
0314 0080Z	Philips Screw - 4x8	63-100
0314 0080Z	Philips Screw - 4x8	77-102
0314 0080Z	Philips Screw - 4x8	79-102
0314 0080Z	Philips Screw - 4x8	81-100
0314 0080Z	Philips Screw - 4x8	83-113
0314 0100Z	Philips Screw - 4x10	27-100
0314 0100Z	Philips Screw - 4x10	35-106
0314 0100Z	Philips Screw - 4x10	37-102
0314 0120Z	Philips Screw - 4x12	25-100
0314 0120Z	Philips Screw - 4x12	57-111
0314 0160Z	Philips Pan Head Screw - M4x16	81-112
0314 0200Z	Philips Screw - 4x20	33-103
0314 0200Z	Philips Screw - 4x20	35-104
0315 0060Z	Philips Screw - 5x6	19-117
0315 0080Z	Philips Screw - 5x8	21-117
0315 0120Z	Philips Screw - 5x12	15-104
0323 0050Z	Philips Sunken Head Screw - M3x5	53-101
0323 0060Z	Philips Sunk Screw - M3x6	17-101
0323 0060Z	Philips Sunk Screw - M3x6	19-100
0323 0060Z	Philips Sunk Screw - M3x6	45-103
0323 0060Z	Philips Sunk Screw - M3x6	55-110
0323 0060Z	Philips Sunk Screw - M3x6	87-102
0323 0100Z	Philips Sunken Head Screw - M3x10	27-103
0323 0100Z	Philips Sunken Head Screw - M3x10	67-109
0324 0060Z	Philips Sunken Head Screw - M4x6	15-108
0324 0060Z	Philips Sunken Head Screw - M4x6	59-107
0324 0060Z	Philips Sunken Head Screw - M4x6	65-107
0333 0080D	Philips Counter Sunk Screw - M3x8	11-103
0343 0060W	Philips Pan Head Screw - M3x6	45-101
0344 0060D	Philips Truss Head Screw - M4x6	59-100
0344 0060D	Philips Truss Head Screw - M4x6	59-102
0344 0080D	Philips Truss Head Screw - M4x8	11-102
0413 0052Z	Tapping Screw - M3x5	87-101
0433 0060W	Tapping Screw - M3x6	47-101
0433 0060W	Tapping Screw - M3x6	77-103

Part No.	Description	Page and Index No
0433 0080Z	Tapping Screw - M3x8	37-111
0433 0082Z	Tapping Screw - M3x8	87-100
0434 0060Z	Tapping Screw - M4x6	49-107
0434 0060Z	Tapping Screw - M4x6	51-100
0434 0060Z	Tapping Screw - M4x6	67-105
0434 0060Z	Tapping Screw - M4x6	75-102
0434 0060Z	Tapping Screw - M4x6	77-107
0434 0060Z	Tapping Screw - M4x6	79-103
0434 0062W	Pan Head Tapping Screw - M4x6	79-106
0434 0080Z	Tapping Screw - M4x8	15-102
0434 0080Z	Tapping Screw - M4x8	17-105
0434 0080Z	Tapping Screw - M4x8	21-102
0434 0080Z	Tapping Screw - M4x8	27-104
0434 0080Z	Tapping Screw - M4x8	31-101
0434 0080Z	Tapping Screw - M4x8	33-105
0434 0080Z	Tapping Screw - M4x8	35-101
0434 0080Z	Tapping Screw - M4x8	41-100
0434 0080Z	Tapping Screw - M4x8	43-108
0434 0080Z	Tapping Screw - M4x8	49-111
0434 0080Z	Tapping Screw - M4x8	67-104
0434 0080Z	Tapping Screw - M4x8	69-104
0434 0080Z	Tapping Screw - M4x8	79-100
0434 0080Z	Tapping Screw - M4x8	81-103
0434 0080Z	Tapping Screw - M4x8	83-106
0434 0082Z	Tapping Screw - M4x8	57-113
0434 0100Z	Pan Head Self-tapping Screw - M4x10	17-104
0434 0100Z	Pan Head Self-tapping Screw - M4x10	51-103
0452 4012Z	Tapping Screw - M4x12	13-103
0573 0040E	Hexagon Headless Set Screw - M3x4	57-110
0573 0040E	Hexagon Headless Set Screw - M3x4	63-105
0573 0050E	Hexagon Headless Set Screw - M3x5	21-122
0573 0050E	Hexagon Headless Set Screw - M3x5	33-111
0574 0040E	Hexagon Headless Set Screw - M4x4	19-106
0574 0040E	Hexagon Headless Set Screw - M4x4	27-113
0574 0040E	Hexagon Headless Set Screw - M4x4	29-106

Part No.	Description	Page and Index No.
0574 0040E	Hexagon Headless Set Screw - M4x4	69-100
0574 0040E	Hexagon Headless Set Screw - M4x4	79-109
0574 0040E	Hexagon Headless Set Screw - M4x4	81-116
0574 0050E	Hexagon Headless Set Screw - M4x5	19-119
0574 0050E	Hexagon Headless Set Screw - M4x5	29-112
0574 0050E	Hexagon Headless Set Screw - M4x5	49-106
0574 0050E	Hexagon Headless Set Screw - M4x5	55-115
0575 0080E	Hexagon Headless Set Screw - M5x8	53-107
0575 0080E	Hexagon Headless Set Screw - M5x8	55-104
0575 0080E	Hexagon Headless Set Screw - M5x8	57-108
0584 0101Z	Hexagon Bolt - M4x10	37-113
0584 0121Z	Hexagon Bolt - M4x12	37-107
0584 0121Z	Hexagon Bolt - M4x12	47-111
0585 0100Z	Bolt - M5x10	21-108
0585 0161B	Hexagon Bolt - M5x16	25-104
0586 0451Z	Hexagon Bolt - M6x45	37-106
0593 0080E	Bolt - M3x8	47-113
0594 0060E	Socket Screw - 4X6	21-119
0594 0060E	Socket Screw - 4X6	35-118
0594 0060E	Socket Screw - 4X6	37-109
0594 0060E	Socket Screw - 4X6	57-105
0594 0080E	Bolt - M4x8	17-112
0594 0080E	Bolt - M4x8	19-101
0594 0080E	Bolt - M4x8	27-110
0594 0080E	Bolt - M4x8	57-115
0594 0080Z	Bolt - M4x8	53-108
0594 0080Z	Bolt - M4x8	55-102
0594 0120E	Hexagon Bolt - M4x12	39-111
0594 0200E	Hexagon Bolt - M4x20	57-107
0595 0080E	Hexagon Bolt - M5x8	53-105
0595 0080Z	Bolt - M5x8	49-112
0595 0120E	Socket Screw - M5X12	15-103
0595 0120E	Socket Screw - M5X12	19-110
0595 0140E	Hexagon Bolt - M5x14	37-114
0595 0140E	Hexagon Bolt - M5x14	53-106

Part No.	Description	Page and Index No
0595 0140E	Hexagon Bolt - M5x14	55-103
0595 0140E	Hexagon Bolt - M5x14	57-109
0622 0060E	Spring Pin - 2x6mm	35-100
0622 0250E	Spring Pin M2x250	17-103
0623 0080E	Spring Pin - 3x8mm	35-116
0623 0080E	Spring Pin - 3x8mm	49-104
0623 0080E	Spring Pin - 3x8mm	51-104
0623 0100E	Spring Pin - 3x10mm	35-120
0623 0100E	Spring Pin - 3x10mm	37-121
0623 0120E	Spring Pin - M3x12	35-102
0623 0120E	Spring Pin - M3x12	75-107
0623 0140E	Spring Pin - 3x14mm	19-116
0623 0140E	Spring Pin - 3x14mm	35-123
0623 0160E	Spring Pin - 3x16mm	39-105
0623 0160E	Spring Pin - 3x16mm	47-115
0623 0180E	Spring Pin - 3x18mm	47-116
0623 0200E	Spring Pin - 3x20mm	19-115
0623 0200E	Spring Pin - 3x20mm	29-111
0624 0160E	Spring Pin - 4x16mm	29-110
0700 0060G	Flat Washer - M6	35-121
0700 0060Z	Flat Washer - M6	25-110
0701 0030Z	Flat Washer - M3	61-107
0701 0030Z	Flat Washer - M3	73-110
0701 0040Z	Flat Washer - M4	21-118
0701 0040Z	Flat Washer - M4	27-109
0701 0040Z	Flat Washer - M4	35-117
0701 0040Z	Flat Washer - M4	37-110
0701 0050Z	Flat Washer - M5	21-109
0701 0060Z	Flat Washer - M6	71-103
0701 0080Z	Flat Washer - M8	25-103
0701 0080Z	Flat Washer - M8	43-104
0705 0040B	Toothed Washer	11-105
0705 0040B	Toothed Washer	25-112
0705 0040B	Toothed Washer	81-106
0707 3050B	Bushing - 3x5mm	41-105

Part No.	Description	Page and Index No.
0707 3080B	Bushing - M3x8	41-106
0707 4160B	Bushing - 4x16mm	49-105
0707 6120B	Bushing - 6x12mm	21-121
0707 8105B	Bushing - M8x10.5	45-102
0710 0040Z	Hex Nut 4	25-109
0710 0040Z	Hex Nut 4	37-108
0710 0040Z	Hex Nut 4	47-112
0712 0060Z	Hexagon Nut - M6	19-113
0712 0060Z	Hexagon Nut - M6	21-104
0713 0040B	Hexagon Nut - M4	27-118
0713 0040B	Hexagon Nut - M4	29-100
0713 0040B	Hexagon Nut - M4	33-110
0713 0040B	Hexagon Nut - M4	35-114
0713 0040B	Hexagon Nut - M4	65-106
0713 0050B	Hexagon Nut - M5	17-109
0713 0050B	Hexagon Nut - M5	19-111
0713 0050B	Hexagon Nut - M5	21-120
0713 0050B	Hexagon Nut - M5	23-107
0713 0050B	Hexagon Nut - M5	35-119
0713 0050B	Hexagon Nut - M5	47-107
0713 0050B	Hexagon Nut - M5	65-111
0713 0080B	Flanged Hexagon Nat - M8	47-108
0720 0020Z	Retaining Ring - M2	73-101
0720 0020Z	Retaining Ring - M2	81-110
0720 0020Z	Retaining Ring - M2	83-115
0720 0025Z	Retaining Ring - M2.5	73-102
0720 0030Z	Retaining Ring - M3	37-118
0720 0030Z	Retaining Ring - M3	45-100
0720 0030Z	Retaining Ring - M3	47-102
0720 0030Z	Retaining Ring - M3	65-108
0720 0030Z	Retaining Ring - M3	75-103
0720 0030Z	Retaining Ring - M3	77-105
0720 0040Z	Retaining Ring - M4	21-101
0720 0040Z	Retaining Ring - M4	25-106
0720 0040Z	Retaining Ring - M4	27-106

Part No.	Description	Page and Index No
0720 0040Z	Retaining Ring - M4	27-108
0720 0040Z	Retaining Ring - M4	31-102
0720 0040Z	Retaining Ring - M4	35-110
0720 0040Z	Retaining Ring - M4	37-117
0720 0040Z	Retaining Ring - M4	39-101
0720 0040Z	Retaining Ring - M4	43-109
0720 0040Z	Retaining Ring - M4	47-103
0720 0040Z	Retaining Ring - M4	67-108
0720 0040Z	Retaining Ring - M4	71-100
0720 0040Z	Retaining Ring - M4	73-103
0720 0040Z	Retaining Ring - M4	75-100
0720 0040Z	Retaining Ring - M4	77-104
0720 0050Z	Retaining Ring - M5	17-106
0720 0050Z	Retaining Ring - M5	21-123
0720 0050Z	Retaining Ring - M5	27-117
0720 0050Z	Retaining Ring - M5	33-101
0720 0050Z	Retaining Ring - M5	35-122
0720 0050Z	Retaining Ring - M5	49-110
0720 0050Z	Retaining Ring - M5	53-103
0720 0050Z	Retaining Ring - M5	57-104
0720 0050Z	Retaining Ring - M5	71-104
0720 0050Z	Retaining Ring - M5	75-108
0720 0050Z	Retaining Ring - M5	77-113
0720 0060Z	Retaining Ring - M6	25-107
0720 0060Z	Retaining Ring - M6	27-119
0720 0060Z	Retaining Ring - M6	37-104
0720 0060Z	Retaining Ring - M6	43-100
0720 0060Z	Retaining Ring - M6	47-104
0720 0060Z	Retaining Ring - M6	49-108
0720 0060Z	Retaining Ring - M6	51-106
0720 0060Z	Retaining Ring - M6	69-106
0720 0060Z	Retaining Ring - M6	77-106
0720 0070Z	Retaining Ring - M7	67-107
0720 0080E	Retaining Ring - M8	39-106
0720 0080Z	Retaining Ring - M8	19-109

Part No.	Description	Page and Index No.
0720 0080Z	Retaining Ring - M8	21-106
0720 0080Z	Retaining Ring - M8	21-111
0720 0080Z	Retaining Ring - M8	29-102
0720 0080Z	Retaining Ring - M8	35-109
0720 0080Z	Retaining Ring - M8	39-103
0720 0080Z	Retaining Ring - M8	47-105
0720 0080Z	Retaining Ring - M8	69-102
0720 0080Z	Retaining Ring - M8	77-111
0720 0100Z	Retaining Ring - M10	43-101
0720 0120Z	Retaining Ring - M12	37-101
0720 0120Z	Retaining Ring - M12	81-113
0725 0100Z	Retaining Ring - M10	19-103
0725 0160E	Retaining Ring C - M16	57-101
0725 0220Z	Retaining Ring - M22	35-111
0740 3007	Ball Bearing - 7x19x6mm	35-112
0740 3007	Ball Bearing - 7x19x6mm	37-105
0740 3008	Ball Bearing - 8x22x7	69-105
0740 3010	Ball Bearing - 10x26x8mm	19-112
0740 3010	Ball Bearing - 10x26x8mm	33-104
0740 3206	Ball Bearing - 6x19x6	37-116
0740 3808	Ball Bearing - 8x16x5mm	33-109
0741 3506	Ball Bearing - 6x12x4 Mm	39-102
0741 3706	Ball Bearing - 6x10x3	81-114
0741 3807S	Ball Bearing - 7x14x5	19-114
0741 3807S	Ball Bearing - 7x14x5	21-105
0741 3908S	Ball Bearing - 8x19x6	19-118
0800 0084	Philips Pan Head Screw - M2.3x12	23-106
0800 0084	Philips Pan Head Screw - M2.3x12	83-104
0801 1004	Screw - M4X4	13-100
0801 1004	Screw - M4X4	15-107
0801 1004	Screw - M4X4	27-102
0801 1004	Screw - M4X4	29-108
0801 1004	Screw - M4X4	33-100
0801 1004	Screw - M4X4	61-105
0801 1004	Screw - M4X4	63-101

Part No.	Description	Page and Index No
0801 1004	Screw - M4X4	65-110
0801 1135	Philips Pan Head Screw - M3x3	21-113
0802 5097	Tapping Screw - M3x10	11-108
0804 4046	Spring Pin - 4x16	19-105
0804 4048	Spring Pin - 4x20	19-104
0804 4055	Pin	27-112
0804 4060	Spring Pin - M4x22	37-115
0804 4061	Spring Pin - M6	29-105
0804 6074	Hexagon Bolt - M4x8	63-104
0804 6090	Hexagon Bolt - M4	33-112
0804 6091	Hexagonal Set Screw - M2x5	55-116
0804 6092	Hexagonal Set Screw	19-108
0804 6092	Hexagonal Set Screw	55-111
0804 6101	Hexagon Bolt - M3	35-103
0805 0084	Retaining Ring	33-106
0805 3104	Ball Bearing - 8x22x7mm	21-112
0805 3134	Ball Bearing - 10x26x8mm	19-102
0805 3263	Bearing - 6 X 10 X 6mm	27-115
0805 3452	Ball Bearing - 10x22x6mm	39-107
0805 3452	Ball Bearing - 10x22x6mm	47-114
0805 6009	Rubber Foot	15-105
0807 3041	Spring Washer	75-109
0807 3083	Washer	17-111
0807 3103	Washer - 4x13x2.3mm	55-108
0807 4118	Flat Washer	77-112
0807 4126	Flat Washer - 6.2x12x0.2mm	55-107
0807 5004	Washer	35-113
0807 5013	Flat Washer - M8.4	43-110
0807 5044	Spacer - 8.1mm X 11.5mm X 0.2	55-106
0807 5076	Washer - 8x13x2.2mm	55-109
0807 7013	Spacer - 10.2 X 14 X 0.2 mm	19-107
0807 7013	Spacer - 10.2 X 14 X 0.2 mm	21-110
0807 7013	Spacer - 10.2 X 14 X 0.2 mm	21-127
0807 7013	Spacer - 10.2 X 14 X 0.2 mm	29-101
0807 7013	Spacer - 10.2 X 14 X 0.2 mm	47-106

Part No.	Description	Page and Index No.
0807 7018	Washer - M10	21-116
0807 7055	Holder - Main Shaft	21-107
0807 7064	Spacer	81-105
0807 7114	Washer - 16x24x0.3mm	55-105
0807 7114	Washer - 16x24x0.3mm	57-102
0808 0021	Rubber Ring	49- 19
0950 5012B	Philips Screw With Flat Washer - M5x12	95-102
0951 3004Z	Philips Screw With Flat Washer-M3x4	23-109
0951 3004Z	Philips Screw With Flat Washer-M3x4	35-115
0951 3004Z	Philips Screw With Flat Washer-M3x4	37-119
0951 3004Z	Philips Screw With Flat Washer-M3x4	83-101
0951 3005Z	Philips Pan Head Screw - M3 X 5	23-102
0951 3005Z	Philips Pan Head Screw - M3 X 5	27-107
0951 3005Z	Philips Pan Head Screw - M3 X 5	29-107
0951 3005Z	Philips Pan Head Screw - M3 X 5	51-101
0951 3006Z	Philips Screw With Flat Washer - M3x6	15-109
0951 3006Z	Philips Screw With Flat Washer - M3	17-100
0951 3006Z	Philips Screw With Flat Washer - M3	25-108
0951 3006Z	Philips Screw With Flat Washer - M3	27-101
0951 3006Z	Philips Screw With Flat Washer - M3	35-105
0951 3006Z	Philips Screw With Flat Washer - M3	61-100
0951 3006Z	Philips Screw With Flat Washer - M3	75-105
0951 3006Z	Philips Screw With Flat Washer - M3	83-112
0951 3008Z	Philips Screw With Flat Washer - M3	25-111
0951 3008Z	Philips Screw With Flat Washer - M3	43-106
0951 3008Z	Philips Screw With Flat Washer - M3	73-106
0951 3008Z	Philips Screw With Flat Washer - M3	83-117
0951 3012Z	Philips Screw W/h Flat Washer-M3x12	41-104
0951 3012Z	Philips Screw W/h Flat Washer-M3x12	83-105
0951 4006B	Philips Screw With Washer - M4x6	95-100
0951 4006Z	Philips Screw With Flat Washer M4x6	11-109
0951 4006Z	Philips Screw With Flat Washer - M4	21-125
0951 4006Z	Philips Screw With Flat Washer - M4	33-107
0951 4006Z	Philips Screw With Flat Washer - M4	35-108
0951 4006Z	Philips Screw With Flat Washer - M4	49-100

Part No.	Description	Page and Index No
0951 4006Z	Philips Screw With Flat Washer - M4	53-104
0951 4006Z	Philips Screw With Flat Washer - M4	55-113
0951 4006Z	Philips Screw With Flat Washer - M4	57-100
0951 4006Z	Philips Screw With Flat Washer - M4	73-107
0951 4008Z	Philips Screw With Flat Washer M4x8	25-105
0951 4008Z	Philips Screw With Flat Washer M4x8	29-104
0951 4008Z	Philips Screw With Flat Washer M4x8	37-100
0951 4008Z	Philips Screw With Flat Washer M4x8	39-100
0951 4008Z	Philips Screw With Flat Washer M4x8	39-108
0951 4008Z	Philips Screw With Flat Washer M4x8	53-100
0951 4008Z	Philips Screw With Flat Washer M4x8	55-114
0951 4008Z	Philips Screw With Flat Washer M4x8	57-116
0951 4008Z	Philips Screw With Flat Washer M4x8	61-104
0951 4010Z	Philips Screw With Flat Washer M4 X	27-120
0951 4010Z	Philips Screw With Flat Washer M4 X	49-109
0951 4010Z	Philips Screw With Flat Washer M4 X	69-103
0951 4020Z	Philips Screw With Flat Washer - M4	49-103
0951 5035Z	Philips Screw W/t Flat Washer-M3x35	15-106
0952 4008W	Philips Screw - M4x8	31-100
0952 4008W	Philips Screw - M4x8	55-112
0960 3006B	Philips Flange Screw - M3 X 6	83-114
0960 3006Z	Philips Flange Screw - M3x6	37-120
0960 3008B	Philips Flange Screw - M3x8	95-101
0960 4005Z		17-113
0960 4005Z	Philips Flange Screw - M4x5	77-101
0960 4006Z	Philips Frang Screw - M4x6	49-102
0960 4006Z	Philips Frang Screw - M4x6	51-102
0960 4006Z	Philips Frang Screw - M4x6	53-102
0960 4006Z	Philips Frang Screw - M4x6	59-103
0960 4006Z	Philips Frang Screw - M4x6	61-103
0960 4008W	Philips Flange Screw - M4x8	65-109
0960 4008Z	Flange Head Screw - 4 X 8	19-120
0960 4008Z	Flange Head Screw - 4 X 8	21-114
0960 4008Z	Flange Head Screw - 4 X 8	29-103
0960 4008Z	Flange Head Screw - 4 X 8	39-110

Part No.	Description	Page and Index No.
0960 4008Z	Flange Head Screw - 4 X 8	47-117
0960 4008Z	Flange Head Screw - 4 X 8	51-107
0960 4008Z	Flange Head Screw - 4 X 8	65-100
0960 4008Z	Flange Head Screw - 4 X 8	81-111
0960 4008Z	Flange Head Screw - 4 X 8	83-108
0960 4010Z	Philips Flange Screw - M4x10	77-100
0960 4010Z	Philips Flange Screw - M4x10	83-107
0960 5008Z	Philips Flange Screw - M5x8	21-115
0964 3006Z	Tapping Screw With Flat Washer - M3	41-107
0964 4006Z	Tapping Screw W/Flat Washer - M4x6	63-106
0964 4008Z	Tapping Screw W/washer - M4x8	73-104
0964 4008Z	Tapping Screw W/washer - M4x8	75-110
0964 4010Z	Tapping Screw W/washer - M4x10	79-101
0965 3006Z	Tapping Screw With Flat Washer-M3x6	11-100
0965 3006Z	Tapping Screw With Flat Washer-M3x6	79-105
0965 3008W	Tapping Screw With Flat Washer - M3x8	61-106
0965 3008W	Tapping Screw With Flat Washer-M3x8	61-109
0965 3010W	Tapping Screw With Flat Washer-M3x1	23-101
0965 3012W	Tapping Screw With Flat Washer - M3	45-105
0965 3012W	Tapping Screw With Flat Washer - M3	45-106
0965 4008W	Tapping Screw With Flat Washer-M4x8	11-104
1101 0328	Connector Pin Contact	89-101
1101 0328	Connector Pin Contact	93-101
1102 2098	Connector - 12p	55-101
1102 2402	Connector - 4p	91-104
1102 4201	Connector - 2p	91-105
1102 4202	Connector - 3p	89-102
1102 4204	CT Header - 5p	91-106
1102 4206	Connector - 7p	91-107
1102 4497	Connector - 13p	89-103
1102 4818	Connector - 20p	89-104
1102 4819	Connector - 22p	89-105
1102 4823	Connector - 30p	89-106
1102 5219	Connector - 28p	89-107
1102 5221	Connector - 26p	89-108

Part No.	Description	Page and Index No
1102 5312	Connector - 7p	93-102
1102 5561	Connector - 20p	89-109
1102 5563	Connector - 24p	89-110
1102 5572	Connector - 30p	93-103
1102 6576	Connector - 60p	93-104
1102 6593	Connector - 9p	89-111
1102 7036	Connector - 30p	89-112
1102 7290	Connector - 5p	89-113
1102 7297	Connector - 120p	93-105
1103 1332	Connector - 26p	93-106
1104 0239	Lsi Socket - 24p	89-114
1104 0351	Fuse Holder	89-115
1104 0351	Fuse Holder	91-108
1104 0588	Dip Socket - 28p	89-116
1104 0588	Dip Socket - 28p	93-107
1105 0005	Nylon Clip - 3n	21-126
1105 0005	Nylon Clip - 3n	59-104
1105 0005	Nylon Clip - 3n	61-108
1105 0009		17-114
1105 0011	Nylon Clip - 8n	65-103
1105 0016	Nylon Clip - 4n	39-109
1105 0021	Cord Clamper	37-122
1105 0042	Wire Band	23-104
1105 0046	Harness	81-104
1105 0108	Nylon Clip	79-104
1105 0144	Harness Clamp	65-104
1105 0144	Harness Clamp	73-108
1105 0172	Clamp	41-101
1105 0193	Nylon Stud	67-106
1105 0209	Clamp	15-110
1105 0209	Clamp	57-112
1105 0225	Spacer - W Rocking	63-103
1106 0103	Universal Bushing	65-105
1106 0430	Bushing - 13mm	81-101
1107 0354	Fuse - 3.15A 125V	43-107

Part No.	Description	Page and Index No.
1107 0354	Fuse - 3.15A 125V	81-117
1107 0354	Fuse - 3.15A 125V	91-111
1107 0411	Fuse - 2A 125V	83-110
1107 0413	Fuse 3A	89-117
1107 0415	Fuse 5A	43-105
1107 0415	Fuse 5A	83-111
1107 0415	Fuse 5A	89-118
1107 0782	Circuit Breaker - 5A	83-109
1107 0788	Circuit Breaker - 6A	83-109
1204 1015	Dip Switch	89-119
1204 1481	Dip Switch	89-120
1204 1490	Micro Switch - V-53-1A3	77-108
1204 1490	Micro Switch - V-53-1A3	83-102
1204 2239	Micro Switch	23-105
1204 2267	Micro Switch - V-162-3C25	83-116
1204 2353	Switch - PS3670-02	59-106
1204 41442	Microswitch	81-115
1208 1245	Relay - DC24V	91-112
1208 1263	Relay - AC100V	91-113
1208 1317	Relay - DC24V	91-114
1400 0072	Transistor - 2SC37Y	91-115
1400 0234	Transistor - 2SA673A-C	91-116
1400 0403	Transistor - 2SC1623l6	89-121
1400 0455	Transistor - 2SC2873Y	89-122
1401 0398	IC - STA402A	89-123
1401 0400	Transistor Array - SLA4060	89-124
1401 0611	Diode - IS1588	91-117
1401 0835	Diode - 1SS190	89-125
1401 0870	FET 2SK724	91-118
1401 0876	IC - PA2003GR	89-126
1401 0877	IC - TD62083F	89-127
1402 0110	Silicon Diode - 200V-1.7A (R.M.S)	91-119
1402 0452	Zener Diode - RD18FB	91-120
1402 0476	Diode - 1SS184	89-128
1402 0646	Diode - S5VB20	91-121

Part No.	Description	Page and Index No
1402 1204	Diode - 5A 800V	91-122
1402 1263	Diode - 200v - 1A	89-129
1403 0456	Photosensor - EE-SB5-C3	23-110
1403 0519	Photocoupler - TLP621	91-123
1403 0669	Red LED - SLM-13VW	89-130
1403 0690	Sensor - TLP1215	23-103
1403 0691	Photo Sensor	41-102
1404 0135	Varistor - 270V	91-124
1407 1535	IC - TD62308AP	89-131
1407 2187	IC - SN74LS07NS	89-132
1407 2218	TTLIC - SN74LS06NS	89-133
1407 2273	IC - TA8050P	89-134
1407 2348	IC - TC4051BF	89-135
1407 2413	IC - SN74LS138M	89-136
1407 2413	IC - SN74LS138M	93-108
1407 2417	TTL - IC - SN74LS240M	89-137
1407 2417	TTL - IC - SN74LS240M	93-109
1407 2746	IC - CXD1095Q	89-138
1407 2855	Switch - TC4S66F	89-139
1407 3492	CPU -78C10AGF	89-140
1407 3677	IC - MN8357	93-110
1407 3701	IC - TMP82C79M-2	89-141
1407 3885	IC - UPD71054GB-10-3B4	89-142
1407 4127	IC - TL7705ACPS	89-143
1407 4192	IC - SN74LS244M	89-144
1407 4192	IC - SN74LS244M	93-111
1407 4234	IC - SN74LS373M	89-145
1407 4360	TTL - SN74LS11M	89-146
1407 4371	IC - SN74LS145M	89-147
1407 4384	TTL - SN74LS174M	93-112
1407 4528	IC - CY7C167A-35PC	93-113
1407 4565	IC - TE6251	89-148
1408 0604	IC - UPC393G2	89-149
1408 0790	IC - UPC324G	89-150
1408 0827	IC - TA8429H	91-125

Part No.	Description	Page and Index No.
1408 0879	IC - IR9358N	89-151
1408 0880	IC - IR2339N	89-152
1408 1104	IC - MB2803PF-G	89-153
1503 0570	Oscillator - 15mhz	89-154
1503 0680	Osocirrater - CSA20 OMXZ240	93-114
1600 1522	Resistor - 6.8K Ω 7W ± 20%	91-126
1600 1523	Resistor - 1 Ω 10W ± 10%	91-127
1601 7374	Resistor Array - 4.7K Ω	89-155
1601 7376	Resistor Array - 10K Ω ±5% 1/8W	89-156
1601 7377	Resistor Array - 15K Ω ±5% 1/8W	89-157
1601 7396	Resistor Array - 4.7K Ω	89-158
1601 7404	Resistor Array - 10K Ω 1/2W	89-159
1601 8145	Variable Resistor - 5K Ω 0.5W	89-160
1601 8156	Variable Resistor - 2K Ω 0.5W	89-161
1601 8157	Variable Resistor - 100K Ω	89-162
1601 8186	Variable Resistor - 200K Ω	89-163
1602 0991	Noise Filter - 115V	81-102
1602 1501	Resistor - 120Ω 0.1µF	91-128
1604 1382	Capacitor - 10µF 50V	91-129
1604 2089	Capacitor - 1.0µF 1/8W ±20%	89-164
1604 2359	Capacitor - 100µF DC50V ± 20%	91-130
1604 2621	Capacitor - 330µF ± 20%	91-131
1606 1981	Capacitor - 0.0033µF ±5%	89-165
1606 1983	Capacitor - 0.015µF ±5% 50V	89-166
1606 1984	Capacitor - 0.022µF ±5% 50V	89-167
1606 1985	Capacitor - 0.033µF ±5% 50V	89-168
1606 1986	Capacitor - 0.1µF ±5% 16V	89-169
1606 2028	Capacitor - 0.22µF ±5%	89-170
1607 0001	Coil - SN-8S-500	89-171
1607 0280	Inductor - BLM41	89-172
1607 0477	Inductor - BLM21A05	89-173
1607 0477	Inductor - BLM21A05	93-115
1607 0742	Noise Filter - 230V	81-102
1611 4152	Resistor - 1.5K Ω 1/4T ± 5%	91-132

Part No.	Description	Page and Index No
1611 4221	Resistor - 220 Ω 1/4T ±5%	89-174
1611 4512	Resistor - 5.1K Ω 1/4T ± 5%	91-133
1611 6361	Resistor - 360Ω 1/8T ±5%	89-175
1611 6470	Resistor - 47 Ω 1/2T ±5%	89-176
1630 2101	Resistor - 100Ω 1/8W	89-177
1630 2221	Resistor - 220 Ω	89-178
1630 2471	Resistor - 470Ω 1/8W ±5%	93-116
1630 3102	Resistor - 1KΩ 1/10W ±5%	89-179
1630 3102	Resistor - 1KΩ 1/10W ±5%	93-117
1630 3103	Resistor - 10KΩ 1/10W ±5%	89-180
1630 3103	Resistor - 10KΩ 1/10W ±5%	93-118
1630 3124	Resistor - 120Ω ±5% 1/10W	89-181
1630 3133	Resistor - 13KΩ ±5% 1/10W	89-182
1630 3151	Resistor - 150KΩ ±5% 1/10W	89-183
1630 3154	Resistor - 150K 0HM ±5% 1/10W	89-184
1630 3203	Resistor - 20 Ω ±5% 1/10W	89-185
1630 3222	Resistor - 2.2KΩ 1/10W ±5%	89-186
1630 3223	Resistor - 22kΩ - 1/10W	89-187
1630 3242	Resistor - 2.4KΩ ±5% 1/10W	89-188
1630 3243	Resistor - 24KΩ ±5% 1/10W	89-189
1630 3244	Resistor - 240KΩ ±5% 1/10W	89-190
1630 3302	Resistor - 3kΩ - 1/10W	89-191
1630 3303	Resistor - 30K Ω ±5% 1/10W	89-192
1630 3332	Resistor - 3.3KΩ 1/10W ±5%	89-193
1630 3333	Resistor - 33K Ω ±5% 1/10W	89-194
1630 3391	Resistor - 390Ω 1/10W ±5%	89-195
1630 3393	Resistor - 39K Ω 1/10W	89-196
1630 3471	Resistor - 470Ω - 1/10W	89-197
1630 3472	Resistor - 4.7KΩ 1/10W ±5%	89-198
1630 3472	Resistor - 4.7KΩ 1/10W ±5%	93-119
1630 3473	Resistor - 47KΩ 1/10W ±5%	89-199
1630 3511	Resistor - 510Ω 1/10W ±5%	89-200
1630 3513	Resistor - 51KΩ ±5% 1/10W	89-201

Part No.	Description	Page and Index No.
1630 3514	Resistor - 510KΩ ±5% 1/10W	89-202
1630 3562	Resistor - 5.6K Ω ±5% 1/10W	89-203
1630 3682	Resistor - 6.8kΩ - 1/10W	89-204
1630 3683	Resistor - 68KΩ ±5% 1/10W	89-205
1630 3823	Resistor - 82K Ω ±5% 1/10W	89-206
1630 3824	Resistor - 820KΩ ±5% 1/10W	89-207
1633 3601	Resistor - 3.6KΩ ±5% 1/10W	89-208
1633 4121	Resistor - 4.12KΩ ±1%	89-209
1633 4991	Resistor - 4.99KΩ ±1%	89-210
1633 6041	Resistor - 6.04KΩ ±1%	89-211
1640 2101	Capacitor - 100µF ±20% 25V	89-212
1640 5100	Capacitor - 10MICROF ±20% 50V	89-213
1640 5221	Capacitor - 220µF ±20% 50V	89-214
1642 0101	Capacitor - 100µF ±20% 50V	93-120
1660 3101	Capacitor - 100PF 50V	89-215
1660 3102	Capacitor - 1000PF ±5% 50V	89-216
1660 3151	Capacitor - 150PF ±5% 50V	89-217
1660 3151	Capacitor - 150PF ±5% 50V	93-121
1660 3220	Capacitor - 122PF ±5% 50V	93-122
1660 3221	Capacitor - 220PF ±5% 50V	93-123
1660 5103	Capacitor - 10000PF ±10% 50V	89-218
1660 5103	Capacitor - 10000PF ±10% 50V	93-124
1660 9104	C - 0.1µF 25V	89-219
1660 9104	C - 0.1µF 25V	93-125
1902 0003	SRAM - 64k - X8 - 100ns	93-126
2701 0101	Metal Screen Seal	53- 11

Part No.	Description	Page and Index No